An introduction

for to learne to recken with the pen, or wyth the counters accordynge to the trew cast of Algorisme, in hole nũbers or in broken, newly corrected. And certayn notable and goodlye rules of false positions there vnto added, not before sene in our English tong, by the which all manet of difficile questions may easely be dissolued and assoyled. Anno. 1552.

To the reader.

What art and feate (deare reader) whome vtilite and neceſſite bothe do comuende, neadeth greatly of no other commendation. Howe profitable and neceſſarye this feat of Algoriſme is, to all maner of perſons, whiche haue rekenynges or accountes, other to make, or elles to receue, nedeth no declaration.

Neyther is this arte onely neceſſarye to thoſe, but alſo in maner to all maner of ſciences, and artificyes. For what craſte is that but it ſomtime dothe occuppye not onely one parte of this feate, but all the partes. And forbycauſe that dyuers rules in this booke haue not ben in tymes paſte, very comodiouſly expreſſed, and ſet forth, and many examples, mo then nedid a greate ſorte coheaped together. Therfore paynes haue bene taken both in the better and more clearer declaration and expreſſynge of the ſayd rules: and alſo in the reſectynge and cuttyng of diuers ſuperfluouſe & voyde thynges, rather hinderance

derance to the dylygent reader, than for the raũce. Furthermore there is added ỹ rules of false positions, the whiche howe conuenient and profitable they be to the ready solution of all hard and misty questions, when ye haue redde them then iudge. Now thenne ye shall vnderstande that in this arte there are. bii. necessarye and distint partes to be knowen. Numeration, Addition, Subtractiõ, Multiplication, Partition, Progression, and Reduction. Of the which. bii. hereafter shall be syngularly entracted of eche of theim in theyr chapters. But I aduertise you fyrst to begynne at the fyrste part, & then successiuely to the second, and thyrd. &c. learnyng euery parte by it selfe exactely, as they be set forth in this boke, for yf you lepe to the second part, before you haue perfectly the fyrst, or to the thyrde, before you haue sene the second, ye shall neuer prosper ne profytte in this arte. Vale.

Finis.

¶ The fyrst parte of Numeration.

Umeration is a manner of expressynge of numbers by certayn fygures which are called fygures of Algorisme, the whiche be tenne, as in thys example.

i. ii. iii. iiii. v. vi. vii. viii. ix.

1 2 3 4 5 6 7 8 9 0

Of the whiche nyne be significatyue, the tenth called a cypher, signifieng nothyng of it selfe, but only set before the other significatyue fyguts augmenteth theyr signification. In numeration by this crafte ye must euermore begynne at the ryght syde of the boke, and so towardes the lyft syde, as in this example.

k i h g f e d c b a

3 2 0 4 6 7 5 1 8 9

This fygure 9 vnder a, standeth in the fyrste place. 8 vnder b, standeth in the seconde place, and so forth to the ende, so

that

that z vnder k, standeth in the laste place. By these teme fygures al maner of num ber possible to be excogitate, may clearlye and playnly be expressed, whiche albeit, that of them selfe they signifye but symple and lytle number, as ye se afore, yet accordynge to the dyuersitie of the place they stande in, dyuersly doth theyr signification amount. Wherfore in numeratiō ye must note twoo thynges, the fygure sygnificatiue, and the place it standeth in for the signification of the fygure dependeth vpō the number of the place it standeth in. For example, this fygure 8 standynge alone, or in the fyrste place sygnyfyeth but. viii. but yf he stande in the seconde place, as here 80 he sygnifieth. viii. tymes tenne, whyche is called, iiii. score. yf he stand in the thyrd place, as here 800 he sygnifieth. viii. hūdreth. &c. Therfore ye must know perfectely the significatiō of euery place, before ye can perfectly nūber. Wherfore vnderstand ye, that ỹ fyrst place is a place of vnities, so that a figure standynge in it, signifyeth no more then

though he stand alone. The second place is a place of tennes. The thyrd is a place of hūdrydes. The fourth place is a place of thousandes. The fyfth place, a place of tenne thousandes. The .vi. place a place of hundreth thousandes. The .vii. place, is of thousand thousandes, which is called a myllyon. The .viii. place, is of tenne myllions. The .ix. is a place of hundreth myllyons. The .x of thousand myllyons. The .xi. of ten thousande myllions. The xii. of a hundreth thousande myllyons. The .xiii. of a thousand thousand million which is called myllyon vpon myllyon. And so forth infinitely, euery place ensuinge, signifieth .x. tymes as much as the place goynge before. This muste thou know perfitly what euery place gyueth and signifieth, for the place gyueth denomination, and the fygure standing in the same place expresseth how many of the same denomination is to be vnderstand, as in example ye shal more plainely perceiue In this summe 3400872619 this figure 2 standyth in the .iiii. place, now by your

rule

rule afore, the. iiij. place is a place of thou
sandes, then thys fygure 2 standynge in
the same place gyueth vs to witte, that it
is two thousand. Lykewyse thys figure
8 standeth in the. vj. place, nowe by your
rule afore spoken of, the. vj. place is of
hundreth thousandes: then this figure 8
situat in the same place receaueth denomi
nation of the place, & representeth to vs
viij. hundreth thousandes. Lykewyse
this figure 1 standeth in the second place
and for bycause the second place is a place
of tennes, therfore this figure 1 standyng
there is bound to the signification of the
place, and so signifyeth one tenne: yf a fy-
gure of 4 stode there, it shuld signify. iiij.
tennes, that is fourty, and so forth. Then
for a farther declaracion of the forsayde
summe, and all other lyke summes. This
fygure 9 standynge in the fyrst place, syg-
nifyeth but hym selfe, that is. ix. This fy-
gure 1 standynge in the seconde place, by-
cause the seconde place is euer a place of
tennes, sygnyfieth one tenne. The fy-
gure 6, standynge in the thyrde place,

bycause the thyrd place is a place of hun-
dreth, doth signifye. vj. hundreth: the fy-
gure 2 in the fourthe place, signifieth. ij.
thousande, the figure 7 forbicause it stan-
deth in the fyfte place, and that place is
a place of tenne thousandes, it signifyeth
vij. tymes ten thousande, the whych is
iij. score thousande and ten: the figure 8
in the. vj. place signifieth. viij. hundreth
thousand: the cypher o that standeth in ȳ
vij. place signifyeth nothyng, but onelye
maketh vp a place that the figures signi-
firatyue folowynge maye encreale there
signification. Lyke iudgement is of the
cypher standynge in the. viij. place: in the
ix. place standeth the figure of 4, and this
place is a place of hundreth myllyons:
therfore this figure 4 there signifyeth
iiij. C. myllions. In the .x. place standeth
the fygure 3, and thys place is a place of
thousande myllions: therfore it signify-
eth. iij. thousande myllions. So the hole
summe is, thre thousand mylions. iiij. C.
milliõs. viij. C. thousand, thre score thou-
sandes. xij. thousand. vj. hundreth, C. xix.

Now

Now to exercise your selfe in numeratiõ numbre with your selfe these summes folowynge, & you shalbe perfecte ynoughe.

Milliõ. Mil. Mil. Mil.

x.	M.	C.	x.	M.	C.	x.	one
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

Furthermoze thou must note that there be in algoziſme thze maner of numbzes, Diget number, Article, and Compoſte.

The digette number, is all maner of numbzes, whych are vnder. x. as theſe.

9 8 7 6 5 4 3 2 1.

The article number is, all numbers whych are of. x. as theſe.

10 20 30 40 50 60 70 80 90.

The compounde numbzer is al maner of numbzes which are cõpound oz made

of the dyget & article together as folow.

11 12 13 14 15 16 17 18 19
21 22 23 24 25 26 27 28 29
31 32 33 34 35 36 37 38 39

And so forth all other. This is sufficient for the knowledge of numbre in Algorisme.

¶ The seconde parte called Addition.

Addition is a collection of diuers and sundry sūmes, into one totall sūme, which contayneth as muche in hym as all the other summes beyng before sundry. In addition are two numbres to be considered, the one is, the numbres whyche must be adioyned together: the other is ỹ numbers whych redoundeth of their addition together, whych otherwyse is called the totall sum. Thē when ye will adde many summes together, fyrst write them fayre the one directly vnder the other, so that the fyrst fygure of the one, be ryght vnder the fyrst of the other, & the second

vnder

vnder the second, every place cõrespondent vnder other, that done drawe a lyne vnder al these seueral summes, as is to se in the exãples folowyng. And when ye wyll adde your nũbers togither, begyn at the fyrst places of your sũmes & adde all the fygures that ye se in the fyrst places of al your sũmes togither, and ỹ that cõmeth of that addition, se whether it be dyget number, article, or cõposte, yf it be but dyget, set ỹ diget beneth the lyne, dyrectely vnder the same fyrst places, yf it be article put a cypher beneth the line, right vnder the same fyrst place, & reserue ỹ article to be added to the next places of thy sũmes & there do likewyse, if it be cõposte, set the dyget vnder the lyne right vnder ỹ same place, & reserue tharticle in your mynde, lykewise to be addyd to the nexte places of thy sũmes, when the figures standing in the last places of your summes be adioyned together, yf anye article or artycles remaine, set them downe next to the fygure ye set laste before vnder the same lyne, as by examples shall appeare.

The

The fyrst summe.	6	7	8	9	4
The seconde summe	3	4	5	6	7
The thyrde summe	2	3	4	5	6
The fourth summe	7	8	9	3	4
The fyfth summe	6	7	4	2	5
The syxth summe	3	4	3	2	2
Summa totalis	3	6	5	9	8

Your fygures set after this sort, adde all the fygures that ye fynde in the fyrst places of all the summes together, begin nynge at the nethermost sayinge, 2, and 5 is 7, and 4 that is 11, and 6 that is 17, and 7 that is 24, and 4 that is 28. This is the hole summe of the figurs added togither founde in the fyrst places, the which num ber is composte, wherfore, as is in youre rule, ye must set the dyget ryghte vnder the same place, beneth the lyne, the whi= che is 8, & kepe the articles in your mynd which is 2. Now to the seconde place, to= warde the lyfte hande, say 2 that I haue in mynde and 2 is 4, and 2 maketh 6, and 3 is 9, and 5 is 14, and 6 is 20, and 9 is 29, now set the 9 vnder 2, & kepe 2 in mynde, and adde them to the fyrst fygure of the

thyrde

thyrde place, that is 3. Nowe say 2 & 3 is
5. and 4 is 9, and 9 is 18, and 4 is 22, & 5 is
27, and 8 is 35. Now set 5 vnder 3, & kepe
3 in mynde. Now to the fourth place, to=
warde the lyft hande where 4 standeth
now 3 that ye haue in mynde and 4 is 7 &
7 is 14, and 8 is 22, and 3 is 25, and 4 is 29
& 7 is 36, set 6 vnder 4, & kepe 3, and adde
that 3 to the vndermost fygure of the vi.
summe that is 3, and say 3 and 3 is 6, and 6
is 12, and 7 is 19, and 2 is 21, and 3 is 24, &
6 is 30. All the figures of this place added
together as ye se, maketh article number
wherfore accordyng to your rule set a cy
fer o vnder that place beneth the lyne, &
the article whiche is 3 nexte to the same
cyfer, & al is fynished. And al these sũmes
thus collected together maketh 306598.

Another example of addition.

100667845
600031950
500545161
801202
6421
____
1202052576

Begyn fyrst as ye dyd before, at the fyrst places, addyng them all together, begyn nyng at the nethermost, sayinge, 1 and 2 is 3, and 1 is 4, and 5 is 9, this is the hole summe of the fygures standynge in the fyrst place, the whiche is dyget number, and therfore accordyng to the rule, set it ryght vnder the same place beneth the lyne. then procede to the secondplace and begyn at the nether ende sayinge, 2 and 6 is 8, and 5 is 13, and 4 is 17, this number is compost nũber, therfore set ꝑ dyget right vnder that place beneth the line, which is 7, reseruinge the article in your mynde, and so to the thyrd place, saying, 1 that I haue in my mynd and 4 that is 5, & 2 is 7 and 1 is 8, and 9 is 17, and 8 is 25, this num ber also is cõpost, wherfore set the diget 5 vnder that thyrde place, & reserue thar ticle 2 in mynde to the next place, then to ꝑ next places sayeng 2 ꝑ I haue in mynd & 6 is 8, & 1 is 9, & 5 is 14, & 1 is 15, & 7 is 22 thꝭ is also cõpost, therfore set ꝑ diget 2 vnder that. iiii. place, & reserue tharticle 2 to the next places, then to the fifth place saying

2 that

2 that I haue in mynd & 4 is 6, & 3 is 9, & 6 is 15, this is also compost nũber, set the diget 5 vnder ỹ fyfth place, and kepe ỹ article in mynde, to the. vj. place saying, 1 ỹ I haue in mynd & 8 is 9 & 5 is 14, and 6 is 20 thys is article nũber, therfore accordyng to the rule set a cyfer vnder the place beneth the lyne, & kepe the artycle in mynd and cum to the. vij. place, in ỹ whych places for bycause thou fyndest nothyng but cyphers to the which ỹ mightes adioyne thy article reserued, ỹ which was 2, therfore vnder ỹ same. vij. place set that same reserued 2, & then come to the. viij. place and there fyndest ỹ nothyng but cyphers wherfore vnder the same place set beneth the lyne a cypher, accordyng to the rule, then come to the. ix. place & say, 5 and 6 is 11, & 1 is 12, the which is cõpost nũber, therfore set ỹ diget which is 2 vnder the line & reserue ỹ article in mynd, which is 1, now for bycause there is no mo places wherunto ye might adde this reserued article therfore accordig to your rule ye shal set it downe next vnto the figure that ye did

set

set vnder the lyne laste, as is in youre example. This .ij. examples were sufficient ynough to the redinesse of addition, how be it yet that it may be the playner I wyl subscribe an other example.

14699000
38290200
01991600
1020000
55100800

Adde the fyrst place togyther. Fyrste there thou fyndest nothynge but cyphers, wherfore set a cypher vnder the lyne, and so lykewyse in the seconde place. In the thyrde place thou fyndeste 6 and 2 whych maketh 8, ỹ whych for bycause it is dygette number, set it vnder that place beneath the lyne. In the .iiij. place is 1 and 9 whych maketh 10, and for bicause that this is article nũber, set a cypher vnder that place beneth the lyne, & reserue the article to the next place sayinge, 1 that I haue in my mynde and 2 is 3, and 9 is 12, and 9 is 21, and 9 is 30 this is also article number, wherfore set a cypher vnder that place beneth the line and reserue the article 3 in mynde to the

nexte place. Then come to the .vj. place: saying, 3 that I haue in my mynde and 2 is 5, and 6 is 11, thys is composte numbre therfore I set the dyget which is 1 ryght vnder that place beneathe the lyne, and reserue the article 1 to the next place, sayinge 1 and 1 is 2, and 1 is 3. and 8 is 11, and 4 is 15, this is also compost, therfore sette the dyget 5 vnder the lyne, and adde the article reserued to the figure in the nexte place sayinge, 1 and 3 is 4, and 1 is 5, thys is dyget numbre, therfore set it vnder the lyne, and all is done.

Certayne examples to practyse youre selfe in, touchynge the exercyse of Addition.

16768900	10000000
36219880	13456289
92000032	20020101
111168841	10000000
19421326	38921090
175526979	92397390

9090201000	640000
26512600000	860000
25432671	998000
21654000	786000
962001	596000
1000	100003
37895100072	3968003
900020	5000268
205812	1060986
901000	10000939
909619	1000939
100000	2000917
3016451	1064669

¶ Of the proue of Addition.

¶ For the proue of addition, ye shall make a crosse after the fashyon that followeth. And then ye shall come fyrste to the addible summes, and plucke out all the 9 that ye fynde there, and the reste whatsoeuer it be, that wyll not make 9 set it at the vpper syde of the crosse. Then come to the total sum

summe vnder the lyne, and lykewyse deduck all the 9 that ye can fynde ther and that that remayneth, not able to make 9 set it at the vndermost part of the crosse, and yf it be lyke the remenaunt of the addyble numbers which stãdeth in the vpper parte of the crosse, your worke was good, yf not it was naught, as by example ye shall the better perceyue.

¶ An example of the proue.

A	2	5	0	6	7	0	
B	3	3	0	4	2	8	
C	5	8	1	0	9	8	

¶ Nowe for to make the proue of thys numbres, ye shall begynne at the fyrst fygure that ye haue made, in sayinge 8 and 0 is 8 and 2 is 10, take away 9 then there resteth 1, than 1, and 7 is 8, and 4 is 12, take awaye 9 rest 3, than 3 and 6 is 9, thanne to the two cyphers of nothynge that nothynge do sygnyfye, thanne 3 and 5 is 8 and 3 is 11, take awaye 9 reste 2, thanne

2 and 2 is 4, this 4 it behoueth you to put at the nether ende of the crosse, thā come to the place of C vnder the lyne and saye 8, ye shall leue the 9 and the cypher o that is nothyng worthe, and adioyne 1 therto and make it 9, and leue that, thanne 8 and 5 is 13, take awaye 9 reste 4, whiche 4 ye shall put at the vpper ende of the crosse and then is your proue good, for bothe the endes be lyke as ye se in this fygure of the crosse And at the two other endes ye shall put twoo oo in tertifying that of them commeth nothynge.

¶ Another example.

A	7	8	9	1	5	4	3	2	6	li.
B	4	9	3	0	0	6	7	1	5	li.
C	2	0	9	9	3	4	7	8	4	li.
D	4	6	0	6	4	5	5	3	0	li.
E	9	3	6	4	5	8	7	7	8	li.
F	4	4	5	1	9	3	0	0	1	li.
G	33	3	4	3	9	3	2	3	4	li.

We

¶ We shall saye semblablye 1 and 8 is 9 and alwayes leue them, thā 0 that doth nothyng, than 4 and 5 ben 9, than 6, then we shall returne to the tenthes, and shall fynde 0 that doth nothynge, than 7 that maketh 9 rest 4, than 3 ben 7, than 8 ben 9 rest 6, then 1 is 7, then 2 is 9, then 0 that is nothyng worth, then 7 and 5 is 9 rest 3 then 7 is 9 rest 1, then 7 is 8 and 3 is 9 rest 2. Then we come to the place of hundrethes, and adioyne the 2 to the 3 that is 5 than 8 is 9 rest 4, and so consequently vn to the ende. And yf peraduēture we fynd this fygure 9 because of the briefues, we shall leaue it. And shall fynde at the ende 9, therfore we shall put at the ende of the crosse 0 in signyfyenge that there is nothyng aboue 9. And so shall we do in the number of G. and we shall fynde lyke 9 for the whiche semblaly we shall put 0. And so is the addition good & well made.

¶ The proue.

As touchinge of addition in broken numbers ye shall fynde that vnder the tytle of reduction hereafter.

Of Subtraction, the thyrde parte.

Subtraction is a maner of debatyng or subducing a lesse summe out of a greater, or lyke of like shewing what remayneth.

In subtraction are two numbers, the fyrst is the number abatyd the second, the number abatynge.

Then when ye wyll subtrahe any one number oute of another. Fyrste ye shall wryte the number to be abatyd, and vnder it directely fygure vnder fygure, and place vnder place wrytte the abatoure, and beneth these two summes drawe a lyne, then begyn your subtraction at the fyrst places, and subduce the figure standyng in the fyrst place of the abatoure of the fyrst fygure standynge in the fyrste place of the number to be abatyd, and the

rest

reſt that remayneth after the abatement ſet it right vnder the ſame place beneth the lyne, and ſo do lykewyſe in the ſecõd the thyrde, and al other places. And whẽ ye haue all done, the number that ſhal remayne vnder the lyne, ſhall be that, that remayneth after the ſubduction of the abatour of the number abatyd. As for example.

Lent	83456	CI lent a man 83456
Payd	41131	li. of the whiche he hath
Reſt	42325	payed me 41131 li, a-

gayne now I deſyre to knowe howe much remayneth. Thẽ accordynge to the rule, fyrſte I ſette the lente money, and ryght vnder that I ſette the repayed mony, figure vnder figure, and place vnder place, as ye ſe by the example Under both theſe ſummes I muſt drawe a lyne. Begyn to ſubtrahe ỹ vnder ſum out of the vpper, ſayinge, 1 oute of 6 remayneth 5, this 5 that remayneth accordíng to the rule ſet vnder the ſame place beneth the lyne, then to the ſecond place

plucke 3 out of 5 remayneth 2, set that vnder the lyne: then to ỹ third place, plucke 1 out of 4 remayneth 3, set that vnder the lyne: then to the fourth place, take 1 oute of 3 remayneth 2, sette it vnder the lyne: then in the fyfth place, take 4 out of 8 remayneth 4, set that also vnder the lyne, & so thou hast fynyshed: Then thou shalte vnderstande ỹ it which is vnder the lyne is the remanẽt of ỹ money not yet payd.

¶ An other example.

87660 li.
67560 li.
20100 li.

¶ Begyn at the fyrst place sayinge, 0 out of 0 remayneth nothyng, sette the figure of nothing vnder the lyne: then to the seconde place 6 out of 6, remayneth nothing, sette the cypher vnder the lyne: then to the thyrd place 5 out of 6 remayneth 1, set 1 vnder the line: then to the .iiij. place 7 out of 7 remayneth nothynge, set the figure of nothynge vnder the line, then to the fyfte place, take 6 out of 8 remayneth 2, set that vnder the lyne, & thus thou hast done. Then 20100 remay-

mayneth yet to be payde.

¶ Nowe thou shalt noote, that somtyme it chaunseth that the fygure standyng beneth is greater then the fygure standyng aboue hym in the sum from whom subduction is made. In thys case thou shalte in thy mynde put tenne, to the fygure in the vpper summe, and then subtrahe the nether fygure out of the same, sette the remanaunt vnder the lyne, and for the same ten, the whych thou diddest put to ỹ vpper figure to make him greater, thou shalte adde one to the nexte fygure standinge in the nether summe, and then subtrahe that lykewise out of the figure aboue hym, yf the fygure aboue be bygger then the figure beneth wyth hys addition other elles e quall, and that remayneth set it vnder the lyne, as ye dyd in the other example. If the figure aboue be lesse then the figure beneth, then do to him as ye dydde to the other before: that is to saye adde ten to hym: and so forth in all other places. Where the nether fygure of the abatoure is greater then

the vpper figure from whence it shoulde be abated, as by this example ye shall more clearly perceaue.

An example.

57295490
48765297
8530193

Begyn your subtraction sayinge, 7 oute of 0 that can not be, therfore forbycause that 7 standynge in the nether summe is more than the fygure standynge in the fyrst place of the vpper summe, ye must adde a tenne, then deduc your 7 out of 10 and there remayneth 3, then come to the second place and for the ten that ye borowed in your mynd & added it the fygure in the fyrste place to make it bygge ynough for the fygure vnder it to be subduced oute of it, for the same tenne I saye ye shall put to ỹ next fygure in the nether place of the nether summe 1, then saye 9 and 1 is 10, then subduce this 10 out of the fygure of 9 standynge aboue it in the vpper summe and that ye can not, therfore do as ye dyd before in the fyrst place, putte 10 to the 9 in your

your mynde saying, 10 and 9 is 19 then de-
duck the 10 beneth out of the 19 aboue, &
there remayneth 9 to be set vnder the li-
ne, then to the fygure standynge in the
thyrde place in the nether summe, put 1
for the ten that ye borowed in your mind
the which ye addyd to 9 in the seconde
place of the vpper summe to make it gre-
ter, sayinge 1 and 2 is 3, subtrahe that 3
out of 4 aboue it, remaynerh 1 to be set
vnder the lyne. Then to the fourth place
take 5 out of 5, remayneth nothyng, set a
fygure of nothynge vnder the lyne, and
come to the .v. place, take 6 out of 9 remai
neth 3 to be set vnder the line, so to the .vi
place, take 7 out of 2 that can not be, ther
fore put to the same 2 accordynge to thy
rule 10, and thē it is 12, thē subduce 7 oute
of 12 remayneth 5 to be set vnder the line,
and for the same 10 that thou borowdest
in thy mynde to put to the fygure of 2 in
the vpper summe, thou shalt adde 1 to the
fygure standyng in the next farther place
in the nether sum, cōming to ȳ same place

whiche

whiche is the seuenth place sayeng 8 and 1 the whyche I haue to sette to hym is 9, then 9 out of 7 that I can not, wherfore lykewyse agayne I must helpe the same 7 with a ten and then it is 17 out of that now subtrahe your 9 and remayneth 8 to be sette vnder the lyne, nowe as ye haue done before in all other places for the 10 here borowed & adioyned, then adde 1 to the next fygure standyng in the seuenth place of the nether number sayeng 4 & 1 is 5, then subduce thys 5 out of ỹ 5 aboue and remayneth nothyng, wherfore sette a fygure of nothyng beneth the lyne, and so ye haue done.

¶ How be it ye shall noote that when ye haue a cypher to be wrytten in the laste place of any summe, ye shall not wryte it, for in the last place it signifyeth nothyng of it selfe, neyther doth it augmente the signification of any of the other.

¶ Yet one other example wyl we set and then make an ende of Subtraction.

100008100 7100
4840574800087
5160235270:3

¶ Ye shall begynne sayinge, 7 oute of 0 that canne not be, for ye canne not take 7 out of nothing, wherfore as ye haue done alwayes in the example afore, put tenne to that cypher, and that maketh 10, then deduc your 7 out of it nowe, and remayneth 3 to be sette vnder the lyne, then for this ten that ye adde to the fygure in the fyrst place of your vpper number, set 1 to the fygure standynge in the seconde and next place of the nether number sayinge 8 and 1 is 9, then 9 out of the cipher aboue that can not be, therfore as ye dyd before make that 0, 10, and then subduce youre 9 out of this added 10 remayneth 1 to be set beneth the lyne, then for this 10 lykewise, that ye borowed in the second place of your vpper number, ye shall sette one to the next fygure standyng in ỹ thyrde and nexte place of the nether summe, sayenge, 1 and the 0 is one, then take that 1 out of 1 aboue hym, remayneth nothyng. set a fygure of nothynge beneth the lyne

then to the.iiii.place take ỹ lyke o out of 7 aboue remayneth 7 styll, to be set vnder the lyne. So to ỹ v. place take 8 out of o that ye can not therfore put 10 to the cypher and then subduce it, and remaynet 2 sette that vnder the lyne, for this tenne adde 1 to the next fygure in the.vi place, which is 4, then 4 and 1 is 5, and 5 out of o that ye can not, then make o 10 & take the 5 out of it remayneth 5 to be set vnder, then for the borowed .x. likewyse sette to the next fygure in the.vii.place of the nether number 1, saying 1 and 7 make 8, & 8 out of 1 ỹ can not be, therfore put tē to that 1 and then 10 and 1 is 11 out of this 11 deduce your 8 remayneth 3 to be set vnder the lyne, then for this 10 to the next fygure in the.viii. of the nether sum set 1 saying 5 & 1 is 6 thē 6 out of 8 remaineth 2, then to the.ix.place, take o out of o remayneth also o, set that vnder the lyne, in the.x.place take 4 out of o that cā not be therfore put 10 to that o & subduce youre 4, remayneth 6, then to the fygure in the next place whiche is the.xi, put 1 sayinge

8 and

3 and 1 is 9 then 9 out of 0, that can not be therfore put ten to it, and then subtrahe your 9 out of 10 remayneth 1, sette it vnder the lyne: for thys borowed tenne put one agayne to the next fygure whych is 4, sayinge 4 and 1 is 5, 5 oute of 0 that can not be, therfore lykewyse agayne make it 10, and then take 5 out of it, remayneth 5 then agayne for your borowed 10 put 1 to the nexte place, but for bycause there be no mo places and therfore subtrahe it alone oute of the fygure aboue, sayinge, 1 out of 1 remayneth nothing, therfore nothynge is to be set vnder the lyne, not so muche as a 0, for bycause it is in the laste place. So then the summe vnder the line is the remayne that remayneth after the subtraction of the lower summe out of ỹ vpper summe.

Here after foloweth the proue of Subtraction.

The

¶ The proue of Subtraction.

The proue whether ye haue subtrahyd well or no, ye muste adde the remayne to the numbre payde, and if they twayne added together do make the fyrste summe lent completely then is it well subtrahyd, if not, it is not well subtrahyd, as by the laste example ye maye well perceaue: for by the rule of additiō, adde 3 to 7 therof commeth 10, set the cypher vnder the line and reserue the article to the next place forth accordynge to the rule of Addition, and thou shalt se thys twoo summes added togyther to come to the fyrste lente summe, and thys of Subtraction shalbe sufficient.

¶ Of Multiplication.

Multiplication is a maner of encreasing or augmentyng one sum by another. In thys feat of multiplycatiō are. iij. nūbres to be noted the multiplied number, the multiplier, & the numbre that redowndeth of the multiplication of ỹ multiplied

typlyed number by the multiplyar, as in example. Multiply this number 4 byȝ & therof come 12, 4 is ꝑ number multiplied, 3 is the number multiplier, 12 the thyrde number that redounded of the multiplycatiõ of one of these number by the other then forȝ moȝe experience and ready woȝkynge in this kynde of operation ye shall perfectly knowe by memoȝy the multyplycation of one dygette by an other, the whiche ye shall haue here in this table folowynge, of the whyche one dygette ye shall looke forȝ in the head of the table, and the other in the lyfte syde of the table.

Here after foloweth the Table.

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

¶By this table ye shall sufficyentlye learne to multyply one dygette by another. As for example, yf ye wyll multyplye 9 by 5 loke for the 9, at the heade of the table, and for 5 the multyplyer at the lyfte fyde of the table, then wyth thy finger descende downe from the place where 9 standeth tyll thou come before

the

the place where the 5 standeth and there in the same angle, thou shalte fynde 45, and that cometh of 5 tymes 9, and so do lykewyse of other.

¶ There is also a proper rule for ỹ multiplication of one dygette by an other, & it is this, when thou wylt multyply one dyget by an other noote the distaunce of the greatea diget from 10 & by the same distaunce multyply the lesse dyget or equall, & that that procedeth of it deducte out of that article whome the lesse nũber doth denominate, and ỹ rest is it that ye seke for, as for example: if ye wyll multyply 7 by 5, fyrste se the dystaunce betwene 7 whych is the greater number & 5, and that is 3, by thys 3 multyply 5, and that is 15 then subduce this 15 out of ỹ article that 5 the lesse number doth denominate, whych is 50, then remayneth 35, ỹ is 5 tymes 7: so lykewyse shall ye doo yf the multyplyar and the multyplyed be like. Yow be it mooste ready it is to know wythout boke very perfytely the multyplicatio n of euery dyget one in an other.

Now when ye wyll multiply any one number the one by the other. First wryte fayre your number to be multiplyed, and vnder it the multiplicatour, beneth both these summes, ye shal drawe a line. Then shal ye consider whether your multiplier be a dyget or article, other elles compost number. If it be dyget number ye shall begynne to multiply by the dyget the figure or dygette standynge in the fyrste place of the number to be multiplied, and that that commeth of it, if it be but a dygette, set it vnder the line ryght vnder ȳ same place, & then procede forther to the next place, and multiply the figure standyng in that place by the same multiplyer, and that that redowndeth of it, if it be a dygette set it lykewyse vnder the lyne ryghte vnder the same place, and soo do lykewyse in euery place folowynge, vnto suche tyme as all the figures standynge in euery place, be multyplyed: then that the whych shalbe founde vnder the lyne is the summe comming of the multiplication of this two numbers, the one by the other

other, as by example ye shall the better perceaue.

2 3 1 4
2
4 6 2 8

¶ If ye wyll multyplye this sum 2314 by this 2, ye shall sette your figurs after thys sorte, as ye se them. Begyn youre multiplication saying 2 tymes 4 is 8, sette that 8 vnder the lyne, then come to the next place and say, 2 tymes 1 is 2, sette it vnder the lyne, the to the thyrde place, 2 times 3 is 6, set that vnder the lyne, so to the fourth place, 2 times 2 is 4, set that vnder the lyne also, & then thou hast done, so that this number 4628 vnder the lyne, is it that commeth of the multiplication of this summe 2314 by this number 2. But if it be so that in the multiplication of anye fygure in the number multiplicable, by the multiplier that it which redeundeth of it be article number, then ye shall set a cypher beneth the lyne ryght vnder ỹ same place where the multiplycation is, and reserue the article to be added to the number that pro-

cedeth of the multiplication of the figure in the next place by the aforesayde multiplyar, the whych lykewyse if it amounte to an article do likewyse as I byd you to do in the fyrste place: but if it be number composte, then shall ye set the dyget vnder the same place beneth the line, and reserue the article to be added lykewyse as is before sayde of article number, as in thys example.

8141642
5
40708210

¶ If ye will multiply this nũber 8141642 by thys figure 5. Begyn at the fyrste place sayinge 5 tymes 2 is 10, nowe forbycause that this number is article, ye shal accordynge to the rule before, sette the cypher vnder the line, and reserue the article 1 to be added to the number that precedeth of the multyplycation of the next fygure standynge in the next place of the summe multiplycable, by the multiplyer: so then come to the next place sayinge, 5 tymes 4 is 20, to this 20 adde 1 for ỹ article that ye reserued, and that maketh 21, therfore bicause

cause that this is a compost nũber ther-
fore sette the dygette vnder the lyne be-
neth the same place, and reserue the arti-
cle to the next place, then come to the. iii.
place sayeng 5 tymes 6 is 30, to this adde
the artycle 2 which ye reserued in ỹ place
next goyng before, and then it is 32 sette
the dygette vnder the lyne as ye dyd be-
fore reseruing tharticle to the next place
then come to the. iiii. place saying, 5 times
1 is 5 to this adde tharticle reserued whi-
che is 3 and that maketh 8, set this diget
nõber vnder the line, & then come to the
v. place sayeng, 5 tymes 4 is 20, now for
bycause that this number is article set 0
vnder that place beneth the lyne reser-
uynge the artycle 2 to be added vnto the
next place, then comme to the. vi. place
sayinge, 5 tymes 1 is 5, to this adde thar-
ticle 2 reserued and then it is 7, set it vn-
der the lyne, thẽ to the. vii. place, sayeng.
5 times 8 is 40, now for bicause it is an ar
ticle number ye shall sette a cypher vn-
der the lyne, and reserue the artycle 4
too the nexte place, and for as moche

as there is no mo places, ye shall set this 4 vnder the lyne next vnto the o that ye sette downe last, and then ye haue done.

¶ When that youre multiplyer is compost or article, then shall ye take the fyrst fygure of your multyplyer, and by hym shall ye multyplye all the fygures of the multiplicable numbers, settynge alwaye that that amounted of it beneth the lyne as ye dyd before. And when ye haue multiplyed the number multiplycable by the fyrst fygure of the multiplyar, then multiplye it agayne by the seconde fygure of the multiplier, setting euermore the first fygure of the number multiplycate, dyrectely vnder the figure multiplicatour, in what place so euer it stande: and the number multiplycable is multiplyed by al the figures of the multiplicatour, then make a stryke vnder them all, addyng all the numbers multiplycate together as they stande, and that which procedeth of that addition is the number multiplicable nowe multyplyed by the hoole nũber multiplycatour, as by this example ye

shall

shall playnly perceaue.

		2	3	4	5
		1	2	3	4
		9	3	8	0
	7	0	3	5	
4	6	9	0		
2	3	4	5		
2	8	9	3	7	3	0

¶ If ye wyll multiply this number 2345 by this nũber 1234, set them fyrst as ye se here 2 vnder them drawe a lyne, then begyn with the fyrst fygure of the multiplicatour, wh iche is 4, and by hym fyrste accordynge to the rule multiplye all the multiplicable nũber throughout, sayinge 4 tymes 5 is 20, sette the cypher vnder the lyne reseruynge the article 2 to the next place: then to the second place, 4 tymes 4 is 16, to that put youre reserued article 2 and it is 18, set the dygette 8 vnder the lyne, reseruyng the article 1, then to the thyrde place, 4 times 3 is 12 and 1 reserued from the place before that is 13, set the dyget 3 vnder the lyne, reseruynge the article 1, then to the. iiii. place, 4 tymes 2 is 8, and 1 reserued is 9

set that dygette 9 vnder the line, and soo hast thou multiplyed this number multiplicable by the seconde fygure of multiplicatour. Now then accordyng to the rule afore, multiplye the multiplycable number by the seconde figure of the multyplycatour sayeng, 3 tymes 5 is 15 sette the dyget 5 vnder the lyne, accordyng to the rule, whych byddeth to set euermore the fyrst fygure of the number multiplycate vnder the place where ỹ fygure multyplycatour doth stande, as here nowe thou multipliest the multiplicable by the second figure of the multiplicatour, whiche is 3, thã say 3 tymes 5 is 15 set this diget 5 vnder the lyne, & beneth ỹ fyrst nõber multiplicate ryght vnder the fygure multiplicatour, as thou seyst in the example, and reserue the article 1, then to the seconde place of the multyplycable, 3 tymes 4 is 12, and 1 that is reserued is 13 set the dyget 3 vnder the lyne, as ye se in the example, & reserue the article 1, and so to the .iii. place 3 tymes 1 is 9 and 1 reserued is 10, set a cypher vnder the lyne, & reserue

serue the article 1: so to the .iiij. place saying 2 times 3 is 6 and 1 reserued is 7 set it vnder the lyne, thus haue ye done youre multiplycatyon by the seconde fygure of the multiplicatour 3. Then take the iij. figure of multiplycatour whych is 2, and multiply also all the numbers multiplycable by him saying 2 tymes 5 is 10 set the cypher beneth the lyne ryght vnder the place where this figure 2 the multiplicatour standeth, as ye se in the example: & reserue the article 1, then to the seconde place 2 times 4 is 8, & one reserued is 9, set that 9 vnder the line: then to ỹ .iij. place, 2 times 3 is 6, set ỹ vnder the line: so to the iiij. place saying 2 times 2 is 4 set ỹ 4 vnder the line. Now begin to multiply with the fourth and last fygure of the multyplycatour, saying 1 tymes 5 is 5 set the 5 vnder the lyne as I warened ye before, & as ye se in the example, then to the secõd place 1 tymes 4 is 4, set that 4 vnder the line, thẽ 1 times 3 is 3, set that 3 vnder the line, thẽ 1 times 2 is 2 set that 2 vnder the liue & ye haue done your multiplica-

tion

tion: then must ye adde accordynge to your rule afore all this syngle multiplied number togyther, and that the which cõ meth of the addition is the number that cõmeth of the multiplication of this num ber 2345 multiplycable by the number 1234, multiplycatour. Then come to the fyrst place, and sewhat is there, and there ye shall fynde a 0, set it vnder the lyne, & so to the seconde place: there ye shal fynd 5 and 8 whych is 13, set the dyget 3 vnder the lyne reseruinge the artycle 1 to be ad= dyd to the next place, then come to ỹ. iii. place, there is 0, 3 and 3 which is 6 to that adde the reserued 1 and that is 7, set that 7 vnder the lyne, now to ỹ fourth place, 5 9 0, and 9 maketh 23, sette the 3 vnder the lyne, reserue the artycle 2, so to the. v place 4 6 and 7, is 17, to that adde the re= serued 2, whych maketh 19, set the 9 vn= der the lyne, and kepe ỹ article 1 in mynde then to the. vi. place 3 and 4 is 7, and 1 re= serued is 8, set it vnder the lyne, then too the. vii. place, there fynde ye but 2, wher= fore set it vnder ỹ lyne, and then haue ye

done

done: so that this summe vnder the lyne 2893730 is the hole number multiplicate

¶ An other example of multiplication.

A 6426003
B 502000

0000000
0000000
0000000
12852006
0000000
32130015

C 3225853506000

¶ Your figures set after this sorte, A is the multiplicable number. B is the number multiplicatour. C is the number multiplicate, which commeth of the addition of all the seuerall numbers togyther stādyng betwen the lynes. Begyn thē your worke, takynge the fyrst fygure of B, the multiplycatour which is ○ & by him multyply all the figures of A, the multiplica-

ble

ble A that that proceth of it set vnder the lyne as ye se: and so to the second fygure of the multiplicatour which is also 0 multiply all the fygures of A by it lyke wyse, and set that which cometh of it vnder the line, right vnder the second place where the multiplicant figure standeth: then to the thyrde figure which also is 0 multyply all the multyplycable number A, and set that whych cometh of it ryght vnder the thyrd place beneth the lyne, as ye se playne in your example: for of ỹ multiplicatiō euermore by ciphers commeth nothing but cyphers. Nowe to the .iiij. place of B, the multiplicatour, there shall ye fynde the figure 2, multiply then all A the multiplicable number by thys figure 2 saying 2 tymes 3 is 6 set that 6 vnder ỹ line right vnder the place where the multiplicatour 2 standeth, as it appeareth in youre example: then to the second place, 2 tymes 0 is nothyng, sette that 0 vnder the lyne nexte the aforesayde 6, and so to the thyrde place, 2 tymes 0 is nothynge, sette the fygure of nothyng downe vnder

der the lyne, and so to the fourth place, 2 tymes 6 is 12 sette the dyget 2 vnder the lyne and reserue the article 1 to the nexte place, then come to the. v. place, 2 tymes 2 is 4 and 1 that I reserued is 5, set that 5 vnder the lyne, nowe come to the syxthe place, sayinge 2 tymes 4 is 8 set that 8 vnder the lyne, so to the seuenth place 2 tymes 6 is 12, set the dyget 2 beneth the lyne, and reserue the article 1 to be set in the next and laste place as ye se in the example. Thus haue ye multiplyed A the multyplicable by . iiii. fygures of B the multiplycatour, therfore now take o the v. fygure of the multiplycatour, and by it also multiplye all the fygures of A, the multiplicable, and thereof shall come all cyphers to be set vnder the lyne, as ye se here in the coppe. Then to the syxthe fygure of B, the multyplycatoure whyche is 5, by thys 5 also multyplye all the fygures of A the multyplycable sayinge 5 tymes 3 is 15 sette that 5 beneth the lyne ryghte vnder the syxthe place where 5

the

the multiplicatour sladeth, as is to se in the coopy: and reserue the artycle to the next place, then come to the second place and say 5 tymes 0 is nothynge, sette the 1 whiche ye reserued in your mynd vnder the line, and so to the thyrde place saying 5 tymes 0 is nothing, set the 0 vnder the lyne, then to the fourth place sayinge, 5 tymes 6 is 30, set the cypher 0 vnder the lyne, reseruynge ỹ article 3 vnto the next place, then come to the .v. place sayinge, 5 tymes 2 is 10, and 3 that I reserued is 13 set the dyget 3 vnder the lyne, & reserue the article 1 to be added to the next place so to the .vi. place saying 5 tymes 4 is 20 and 1 reserued is 21 set 1 the diget vnder the lyne reseruyng 2 the article to ỹ next place, then to the .vii. and laste place sayinge 5 tymes 6 is 30 and 2 that was reserued is 32 set the dyget vnder the lyne & reserue 3 the article to be set in the next & laste place beneth the lyne as ye maye se in the example, & so is all finished: Then vnder all these particular summes drawe a streke, and adde all them together, set-

tynge

ting euer that which commeth of the addicion, vnder the line, as is in ỳ example: the which shall amount vnto this summe, 3225853506000, and this is it that cõmeth of the multiplicacion of the sum A, by the sum B.

¶ Certayne examples of multiplicacion in the which ye may exercise your selfe to be the more practised in it.

A 34523 67

¶ To multiply by. B 88925 39

31071303
10357101
17261835
6904734
1071803
27618936
27618929

Sum. 3070030 8189819

64970 7432

To mul. 13 To mul. 324

194910 29728
64970 14864

Sum. 844010 22296

¶As for the multiplicacion by squares is neither worth the writing nor the readynge: And where as in other copyes is sette duplacyon, triplacion, and quadruplacyon, all that is superfluous, for so muche as it conteyned vnder the kynde of multiplicacio: and they that are expert in thys feate may right well perceaue it.

¶The proffe of multiplicacion.

THe proffe of multiplicacion maye be by two meanes. By the subducyng out of all the 9: and the second way is by particion. As concernynge the fyrst waye: ye shall fyrste make a crosse, then beholde the multiplicable number, and subdue out of it all the nynes, and that that remayneth not able to make 9 set it at the vpper ende of the crosse: then come to the multiplycator, and do lyke wyse in hym, and that whych remayneth all the 9 beyng subduced, set it at the vnder part of the crosse: then multyplye the fygure standynge in the vpper part of the crosse by the fygure standyng in the nether part

of the crosse, and out of the same that commeth of it take 9 as ofte as ye canne: and that that remayneth not able to make 9, set it at the ryght syde of the crosse: then come to the totall summe multiplicate, & subduce all the 6 out of him lykewise, and that whych remayneth not able to make 9, sette it at the lyfte syde of the crosse, and if it be lyke the fygure standynge at the ryght side of the crosse, then is it well, otherwise it is not well.

An example.

A 7963
B 1852

15926
39815
63704
7963

C 14747476

To knowe whether the sum C, be the very summe whych cõmeth of the multiplication of A, by B, then fyrst subduce all the 9 that ye fynde in the multiplycable A, and the reste set it at the vpper end of

the crosse, whiche ye shall finde to be 7: Thē to the multiplicatour B do lykewise and se what remaineth, and ther remayneth also 7, set that also at the nether end of the crosse: then multiplye this 7 standynge in the vpper ende by 7 standinge in the nether ende: and therof cometh 49 when thou hast taken all the 9 out of this 49 there will remaine 4, the whych thou shalt set at the ryght syde of the crosse. Thē come to C, the totall sum of the multiplication & there likewise take out all ỹ 9 that ye fynde there: and the rest not sufficient to make 9, sette it at the lifte side of the crosse, the whyche thou shalt finde to be 4, and forbicause that this 4 to be set at the lyft side, is like the fygure standing in the ryght syde (for that is 4 also) therfore this multiplication is good and well made: & so likewise in al other examples.

¶ The proffe by partition is to diuide the total sūme C by the multiplicator B, and if ỹ quocient be iust A, than is it wel multiplied, other els not. But this waye can ye not practise, vnto such time as ye haue

learn-

learned the feate of Partition.

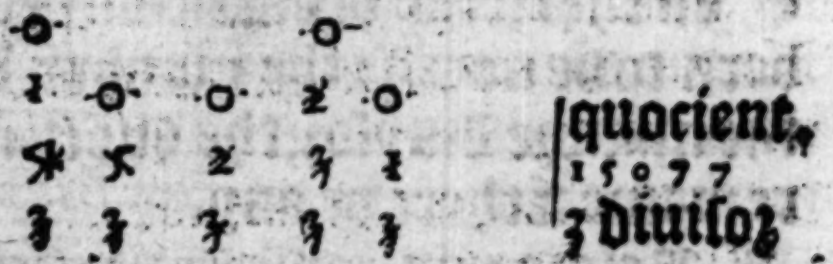
¶ Of Partition the fourth kinde of Algorisme.

PArtition is a part of Algorisme, by the whych ye may easily diuide any greater summe by a lesse or equall shewing howe often times the diuisor is contayned in the numbre diuisible.

¶ In this feate of partition be. iiii. numbers to be noted: the number diuysyble, the numbre diuysor, the quocient, and the remaine if there be any.

¶ Before you come to partition it shall be very neadefull and necessarye for you, rycht perfectly to know the table of multiplication of diggettes whyche is set in the chapter of multiplication. For vnlesse that ye know that perfitlye ye shall styche greately not onely in multiplication, but also in thys feate of partition, and that exactly hadde in memory, the rest shall be farre easier. As for example, if ye wyll knowe howe often times 7 is contayned in 68 ymagin by and by that this 7 should

be contayned 8 tymes: then if ye knowe without the booke perfitlye the forelayd table, ye shal see that 8 tymes 7 is but 56 ergo 7 is conteyned more then 8 tymes in 68, ymagen then, and suppose it to be 9 tymes in 68 than by the table see what 9 times 7 is, and thou shalt se that it is 63, wherfore thou mayst conclude that in 68, 7 is conteyned 9 times and 4 ouer.



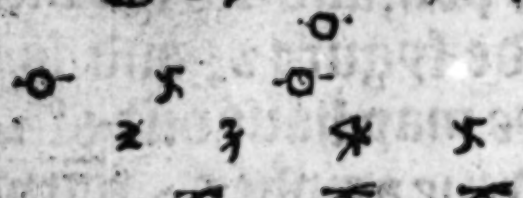
¶ To deuide thys numbre 45231 by 3 the 3 is diuisor. Firste ye shall sette downe your numbers to be deuided, and at the ende of that number on the ryght hande ye shall make a strike, wherin ye shal sette your quocient, and then set downe your

diui-

diuisor which is 3 vnder the fygure that standeth at the vttermost ende at the lyft hand that is vnder 4, and than saye howe many times 3 maye I haue in 4, ones 3 and 1 remayneth ouer, set 1 wythin the stryke and that 1 that remayneth set ouer 4 then strike the diuisor 3 wyth a dasshe of your pen, and set the dyuysor 3 vnder the figure 5, then to ioyne the article 1 to the dygget 5, and it is 15. then saye howe manye times 3 maye I haue in 15, 5 tymes 3, set that 5 in the stryke nexte to the fygure 1 and close vp the artycle 1 and the dygette 5 with a cipher 0 ouer eyther of them, and then strike the diuisor 8 with a dasshe of your pen, and set the diuysor 3 vnder the thyrde fygure 2, and se howe many times 3 ye may haue out of 2 none therfore set downe a cipher 0 within the strike nexte to the fygure 5 and stryke out your diuisor with a dasshe of your penne and set the diuisor 3 vnder the fourthe figure 3 then ioyne the article 2 to the dygette 1 and that maketh 23 than se howe many tymes 3 ye maye haue in 23, 7 ty-

mes, and 2 remayneth, sette that 7 within the strike nexte to the cipher, & the 2 that remayneth set ouer the fourth figure 3 & close vp the article 2 with a cipher 0, then strike out the diuisor and set it vnder the first figure 1 at the right hand, then ioyne the article 2 to the digget 1 and it maketh 21, than se how many times 3 ye may haue in 21, 7 times and nothynge remayneth, then set the 7 within the strike and close the article 2 with a cipher 0 ouer eche of them and stryke oute the deuisor with a dasshe of your pen, and so the third parte of 45231 is 15077.

¶ The seconde example.



No. | 6 diuisor. quotient. 39051 part.

The 6 3 proue.

¶ To dyuyde thys number 23 45 by 6 the 6 is the dyuysor, begynne your diuisi-on at the lyfte hande, as is fayde in the fyrst example, and fette youre diuisor vn-der the thyrd figure 3, for ye may not haue 6 oute of 3. and therefore faye howe many tymes 6 may ye haue in 23, 3 and 5 remay-neth, fet the 3 within the ftrike, and the di-get 5 that remayneth fet it ouer the secõd figure, and clofe the article 2 with a cy-pher 0 ouer it, and then ftrike oute the di-uisor with a dafhe of your pen, & fet your diuysor agayne vnder the thyrde fygure 4, and then ioyne the artycle 5 to the dyg-get, 4, and it is 54, thẽ fe how many times 6 ye maye haue in 54, 9 and nothynge re-mayneth, fette the 9 within the ftrike and clofe vp the article 5 and the diget 4 with a cipher 0 ouer eyther of them, and ftryke out the diuisor with a dafhe of your pen, and fet the diuisor vnder the fygure 5 and fay how many tymes 6 may ye haue oute of 5, no tymes, therfore fet downe a cipher 0 with the ftryke, and lette the 5 ftande & ftryke out the dyuysor wyth a dafhe of

your

your penne, and so the 6 parte of 2345 is 390, and the 5 that remayneth sette at the ende of the quociente in thys maner $\frac{5}{6}$ so the quocient is $390\frac{5}{6}$

¶ To diuide by 2 or 3 figures, or by as many as pleaseth you.

¶ Fyrst set downe your number to be dyuided and youre diuisor vnder it, begynnynge at the lefte side at suche a place as ye maye take the laste fygure of youre deuisor in the laste ende, and then see howe ofte ye may haue that figure in ỹ figure aboue it, and that set apart for your quocyent, wyth the whyche quocient ye shall multiply euery fygure by it selfe of youre diuisor and that that cometh of the multyplycatyon, ye shall abate of the fygure ryght ouer it, puttynge out that other fygure, and set ỹ rest aboue it, and so worke with euery fygure by it selfe throughout the diuisor. Then renewe youre diuisor 1 fygure forwarde towarde youre ryghte hande, as before is rehersed, and so contynue your worde folowynge to the firste

figure

fygure of your number to be diuided.
Thē it is to be noted that if it happe that your multiplyed numbre that ye shoulde abate, be more then the number ouer it then for a generall rule, ye shall not take your diuysor out of the fygure above it except ꝑ it may sufficiently yeld ynough to al your abatementes of the residue, as more playnely shall appeare in the example folowynge.

The

rule.

¶ First set downe this number 4123. and diuyde it be your diuysor 12, begyn your worke at youre lyfte hande, settynge the

arty-

article 1 of your diuisor vnder 4, and the digget 2 vnder the thirde figure 1, and than se how manye tymes the article 1 of your diuisor ye maye haue in the 4 ouer it, ye would saye 4 tymes 1, but that can not be bicause there ye may not haue the quocient 4 multiplied wyth the digget 2 of your diuisor, for thereof cometh 8, and then that 8 ye may not take out of 1 ouer the diget 2. Therfore saye agayne howe manye tymes 2 maye ye haue in 4, 3 tymes and 1 remayneth, set the 3 within the strike for the quocient, & the 1 that remayneth set ouer 4 and strike out the article 2 of your deuisor with your pen. Thē multiplye the quocient 3 with the digget 2 of your diuysor, and therof cometh 6. Then toyne the Article 1 that remayneth, & the digget 1 and it is 11 therout take 6 & there remayneth 5, set the 5 ouer ỹ third fygure 1 and close vp the article 1 ouer 4 with a figure ouer it, and strike out ỹ dygget 2 of your diuisor againe but one fygure forwarde as thus: set the article 1 vnder the

thirde

thyrd figure 1 is the No. and the digget 2 vnder the secõd figure 2, and ther se how manye tymes 1 I maye haue in 5 that remayneth 4 times, & yet there remayneth 1 whych must be set ouer 5, and strike out the article 1 with your penne. Thẽ multiply the digget 2 of your diuysor wyth the quocient 4 and it is 8, then ioyne the article 1 that remayneth, and the digget 2 in No, togither, & it is 12, then take the 8 out of the 12, and ther remayneth 4, set that 4 ouer the second fygure 2 in the No. and close vp the Article 1 wyth a cyfer 0 ouer it and strike oute the digget 2 of your diuisor with your penne. Then renue your diuysor agayne as before is said, and set ye article 1 vnder the seconde fygure No. and thence how many tymes 1 I haue in 4 that remayneth 3 tymes, and 1 remayneth, set that 3 with the strike, for the quocient, & the 1 that remayneth set ouer the 4, and stryke out the article 1 of your diuysor with your penne. Thẽ multiply the quocient 3 wyth the digget 2 of your diuysor, and it is 6, then ioyne the article 1

that

that remayneth, and the digette 5 in No. and it is 13. Then take 6 oute of 13 and ther remayneth 7, set that 7 ouer the dygget 3 in the No. and close vp the artycle 1 with a cyfer 0 ouer it, and strike oute the dygget 2 of your diuysor, and then the 12 part of 4123 is for the quocient 3423, and the 7 that remayneth shal be set at ȳ ende of your quocient, as thus $\frac{7}{16}$

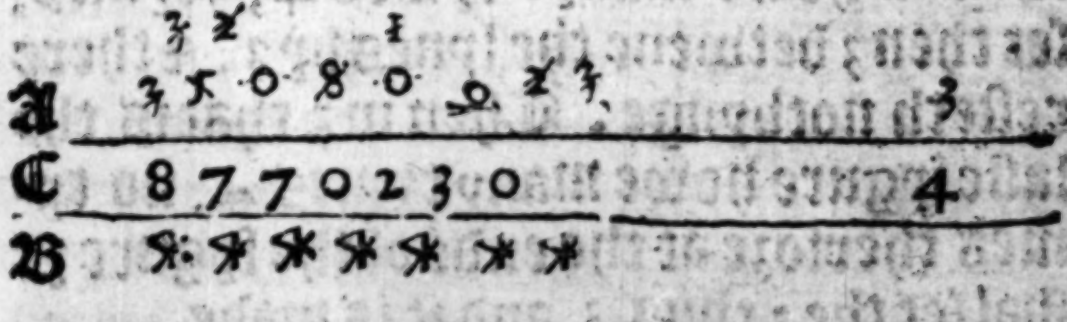
Re. 1	1	2	1	
Dy. 6	4	8	8	5
	1	3	1	4
	6	6	6	6
	1	8	2	9

Re. 121			1	
Dy. 200		4	5	21
		2	1	
		2	2	

¶ Ye shall note that in these two ensamples the quotient standeth in the middes betwixt the two lynes, and the numbre to be deuyded standeth nexte aboue the vppermooste lyne, and the deuysor stan-

deth

deth nexte vnder that lyne. But than ye must marke that there be two dyuisors, one is called the diuisor currant, bycause it is alwayes remouable toward ỳ right hande in the operation, and also it is striken out, and this diuisor standeth alwaye vnder the nether lyne of the quociente. The other diuisor is called the diuisor permanente, for he is not remoued nor blotted as the other is, but standeth alway permanent on the lyft hande directly against the number that is to be deuyded. And vnder ouer hym there standeth the remayne of the whole number whyche remayne can not be deuided by the deuisor, & therfore it is set ouer the deuisor permanente wyth a stryke betwyxte: as ye maye se in the fyrst ensample, where 1 is remayning, and 6 is deuisor.



For as muche as in this ensample we

can

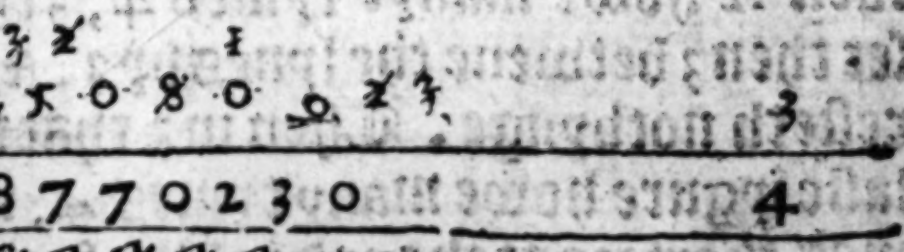
that remayneth, and the digette 5 in No. and it is 13. Then take 6 oute of 13 and ther remayneth 7, set that 7 ouer the dygget 3 in the No. and close vp the artycle 1 with a cyfer 0 ouer it, and strike oute the dygget 2 of your diuysor, and then the 12 part of 4123 is for the quocient 3433, and the 7 that remayneth shal be set at ȳ ende of your quocient, as thus $\frac{7}{16}$

Re. 1	4	2	1	
Dy. 6	4	8	8	5
	1	3	1	4
	0	0	0	0
	4	8	2	9

Re. 121			4	
Dy. 200		4	5	21
		2	1	
		2	2	

¶ Ye shall note that in these two ensamples the quotient standeth in the middes betwixt the two lynes, and the numbre to be deuyded standeth nexte aboue the vppermooste lyne, and the deuysor standeth

deth nexte vnder that lyne. But than ye must marke that there be two dyuisors, one is called the diuisor currant, bycause it is alwayes remouable toward ỹ ryghte hande in the operation, and also it is striken out, and this diuisor standeth alwaye vnder the nether lyne of the quociente. The other diuisor is called the diuisor permanente, for he is not remoued nor blotted as the other is, but standeth alway permanent on the lyft hande directly against the number that is to be deuyded. And iuft ouer hym there standeth the remayne of the whole number whyche remayne can not be deuided by the deuisor, & therfore it is set ouer the deuisor permauente wyth a stryke betwyxte: as ye maye se in the fyrst ensample, where 1 is remayning, and 6 is deuisor.



For as muche as in this ensample we

can

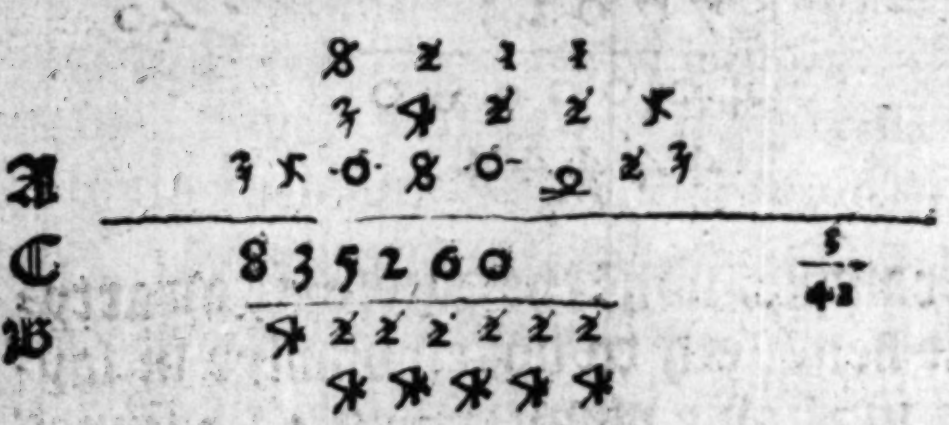
can not take 4 whyche is the diuisor, out of 3, therefore we shall set 4 vnder 5 & saye howe many times 4 haue ye in 35, ye haue 8 times 4, and there resteth 3, ye shall set the 8 betwyxte the two lynes, and the 3 aboue 5, then efface the 5 and the 4, then we shall set, 4 vnder 0 and say, in 30 howe manye times 4, 7 tymes, set 7 betwene the lynes at the righte side by the 8, and there resteth 2, whyche we shall set aboue 0. and efface 0, then set 4 vnder 8, and say in 28 how many times, 4, 7, and there resteth nothing, set 7 betwene the lynes by the 7, then set 4 vnder 0, and say how many times 4 in 0, there is none, therefore set 0 betwene the lynes, then shall we saye in 9 howe manye tymes 4, 2 tymes, set then 2 betwene the lynes, and resteth 1 whyche we shall set aboue 9 and efface 9 then 12 howe manye tymes 4, 3 tymes, set then 3 betwene the lynes by 2, & there resteth nothynge. Then in 3 that is the laste fygure howe many tymes 4, no tymes therfore at the ende of the fygure ye shal set the 3 thus $\frac{3}{4}$ and it is made.

			3	2		8				
A			3	5	0	8	0	9	2	3
C				8	7	7	0	2	3	
B				4	0	0	0	0	0	0
					4	4	4	4	4	

		3
		40

Example. Whē the diuysor is an artycle, it behoueth to do semblablye in sayinge, in 3 howe many tymes 4 no tymes and therefore we shall set 4 vnder 5, and o vnder o, and saye howe manye tyme 4 in 35, 8 times, sette 8 betwene the two lynes vnder 5, and there resteth 3 whyche we shal sette ouer 5, Then sette the 3 that standeth ouer 5 and the o togyther, and that is 30, than saye how many tymes 4 in 30, 7 and alwayes so to the ende. And than we shall set 4 vnder 2, and o vnder 3, and saye in 12, in takynge the one that shall reste of the summe afore, and shall be aboue 9, and the 2 that is after 9 howe many times 4, 3 tymes 4, and than set 3 in the numbre of 4, agaynste 2, and than shall we cease, for there remayneth allonelye 3 to be parted by 40, nowe we shall

not make o vnder 3 as is afore, but at ye end we shal set 3 thus $\frac{3}{40}$



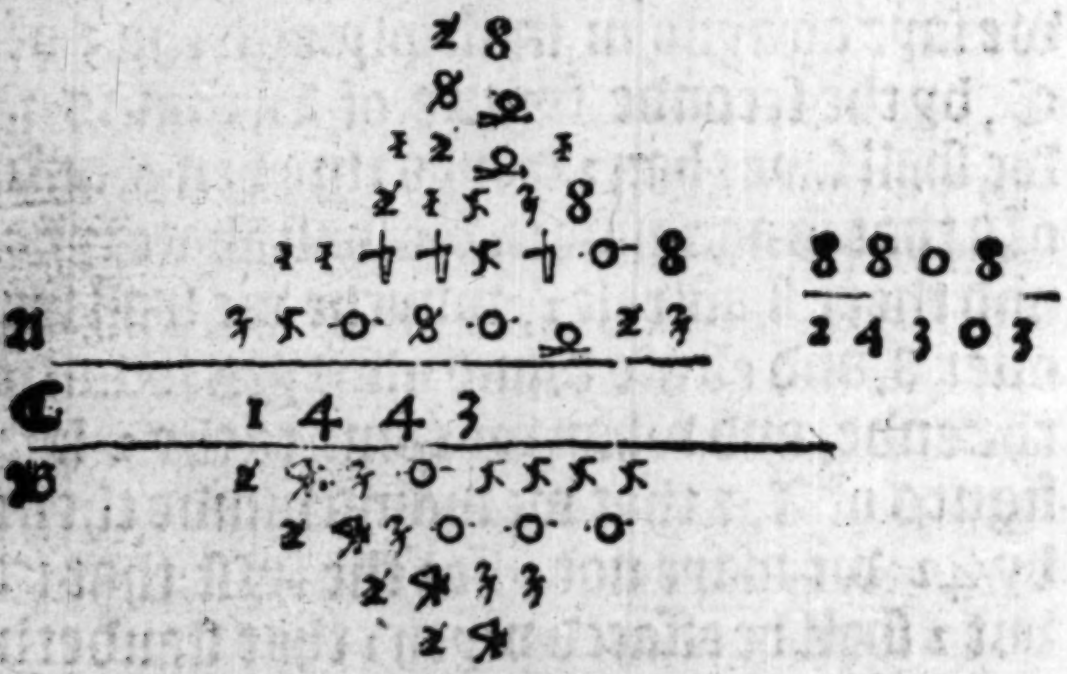
C Ensample, whan the diuysor is compost, as in this fygure afore, we shall say in 35 that ben neare A, how many times 4 that are in the numbre of B. 8 times 4 sette that 8 betwene the two lynes in the place of a C, and ther reasteth 3 which we shall sette aboue 5 and efface 3 5 of A, and 4 of B, then shall we say in multiplynge the 8 of C, by the second figure of B, that is 2, we shall saye two times 8 is 16 than abate 16 of the number of A, agaynste the same 42, and there be 3 whyche is ouer 5 and 0 of the numbre, that be worth 30 and we shall saye, of 30, abate 16 and there re-

steth

steth 14, of the whiche 14 we shall sette 1 ouer 3, and efface 3 and 4 aboue 0 and efface 0, than shall we set the diuysor somewhat forward, the 4 agaynst 0, that shall be effaced, and 2 agaynste 8, and saye in 14 demonstringe 1, that shall be aboue 3 and 4 aboue 0 howe many tyme 4, 3 tymes, set the 3 beneath the lynes in the nũber of C, and there resteth 2, whyche we shall sette ouer 4, and efface 4, than shall we saye agayne in multiplynge the 3 of C, by the seconde fygure of B, that is 2 we shall saye than 2 tymes thre ben 6, and of 8 that is agaynste it, we shall abate syxe and there shall rest 2, whyche we shall set ouer 8, and efface 8, and alwayes so vnto the ende, and whan we come to the 2 last figurs of A, & that we would diuide them by 42 we maye not, for the fyrst that is but 2 shall be effaced wyth 1 that standeth aboue fiue, and bicause that we may take there nothynge we shall sette 0 agaynst 2 of A, in the numbre of c, betwene ỹ lines, and so it is doone, and there shall reste 3 to be diuyded by 42, and that 3 shall be

set at the ende of the particion, as thus $\frac{1}{44}$ and it is finished.

¶ And it is to be knowen that as many fygures as foloweth the firste fygure in the numbre of B, shall be multiplyed by them of the numbre of C, then the multiplycation that therof shall come ye shal abate in the numbre of A, as in thys example shall more playnly appeare.



The 5 3 prove.

In

¶In this enſample in the number of B, that is the deuyſor, be many fygures, and therfore we ſhall ſaye, in 3 of A, howe many tymes 2 of B, 1 tyme, ſette that 1 vpon C, and 1 that remaynethe of 3, ouer 3, and then ſhall we come to the 4 of B and to 1 of C, and multyplye them in ſayinge, 1 tymes 4 is 4, whyche 4 we ſhall abate of the number of A, in takynge 1 aboue 3 and 5 after 3, that ſhalbe worthe 15 and therof we ſhall abate 4 and there reſteth 11, and for the more ſhorteſt waye of 5 onely abate 4, and ſette the 1 that remayneth aboue 5, and there reſteth alwayes 11, then ſhall we come to the 3 of B, and to 1 of C, and make all onely the multiplicacion in ſayinge 1 tymes 3 bene 3, thanne of 10 abate 3 in demonſtrynge 1 ouer 5 and 0 after, and then there reſteth 7, whyche we ſhall ſette ouer 0. then bycauſe of the cypher 0 may nothynge come, we ſhall leue it, and goo to the next fygure and ſaye 1 tymes 5 that is at the laſte ende of B ben 5 but in ſo muche that we maye nothyng abate of 0 that is agaynſte it in the num-

ber A we shall borowe of the figure afore that is 2 onelye one & efface the 8 and set the 7 aboue the 8, and the 1 that we shall holde shalbe worth 10 to the regarde of the number that we be in, then we shal say of 10 abate 5 there resteth 5 whych we shal sette aboue 0, then shall we auaunce oure partetour consequently vnder the other fygures folowynge, that is to saye till the laste of B, be set vnder the laste of A, and then ye may not auaunce thē any further bicause ye be come to the endes of both ỹ numbres.

¶ The proue of diuision or partition is made in thys maner: ye shall fyrst make a crosse, as ye did before in multyplicacion and abate the 9 of the particyon and sette the reste at the lyfte ende of the crosse semblably of ỹ third nūber that is betwixte the two lynes, and set the rest at the right ende of the same crosse, and yf there be no thinge rest set 0. Then multiplye the two nūbers of fygure, for they 2 be dygettes that one by that other, & therof abate all the 9, yf there be nothynge in the fyrste

number, or yf ye maye not diuide it ioyne it with the same that shall come thereof, And so the rest that maye not make 9 set it at the ende vnder the crosse. Then shall we come to the fyrste number and semblably do away the 9 therof, & set ỹ rest aboue the crosse, & if that aboue & that beneth be lyke, the partition is good, or yf not, it is fals. And for to vnderstande it better we make proues by ỹ enlamples aforesayde.

¶ For the fyrste we shall take the parte tour, that is 4, and set it at the lyfte syde of the crosse, then shall we abate the 9 of the third number, &

there rest 8 which 8 we shal set at ỹ right ende of ỹ crosse and multiply it by 4. and therof cometh 32 wherof resteth 5 then adioyne them with the 2 farthynges that we myghte not deuyde, and they shall make 7, the whyche 7 we shall set vnder the crosse, than shall we abate the 9 of the fyrste number that bene the farthynges, and there shall reste 7

whiche & we shall set at the vpper ende of the crosse, and so bene the two endes lyke and it is well made.

¶ Reduction.

REduction is a kynde of Algorisme by the which ye be taught to reduce numbers of lesse denominacyon or value to numbers of more denompynacion or value: or yf the case requyre it, numbers of great denomynacion to the numbers of lesse value. Example of the fyrste. 20 li. 63. S. 44. D. 10. far. Thus reduce the farthinges to pens, & the pens to shyllynges, and the shillinges to powndes: and then thys summe is 23 li. 6 S. 10. D, & 2. far. so haue you reduced the lesse summe to ỹ more. Example to reduce the more to the lesse. Take the same example agayne and reduce the 20 li. 63. S. 44. D. 10. far, all in to farthinges, and it wyll make 22410 farthinges. Fyrst reducynge the powndes to shillinges, then to pens, and al that pens to farthinges: wherefore it shall be verye necessarye for you to knowe what thynge your number doth signifye, whether

ther wayght, mony, measure, or time: and to be expert in all maner of accomptes: it shalbe necessary for you to knowe all maner of waygh tes, coynes, measures, and time. Example in Englishe moneye 4 farthinges make 1 d. 12. d. maketh a shillinge 20 shillinges maketh a pounde.

¶ In weygh t, and fyrst of troy weyghte, euery pownde hath 12 ounces, and euerye ounce 20 peny weygh t, and euerye penye weygh t 20 graynes. &c.

¶ The haperdepeys pownd hath 16 ounces, an ounce 8 drammes, the dramme 3 scruples, the scruple 20 graynes.

¶ Of measure, the yard hath 3 foote, the foote 12 ynches, the ynche 3 barley cornes of length.

¶ Of time, the yeare hath 365 dayes, the daye 24 houres, the houre hath 60 minutes, euery minute 60 secondes, euery secõd 60 thirdes, euery third 60 quarters, euery quarters 60 fyftes, euery fyfte 60, fyxtes, and so forth infinitely.

¶ To reduce the more summe to the lesse.

E. b. when

When thou wylte reduce the moze to the lesse, loke howe manye tymes the lesse is contayned in the moze, and by that nũber multiply the number of the moze and that that commeth of the multiplicacyon sheweth the moze reduced to the lesse.
Example. I wold reduce 8 d. to farthynges loke how many times a farthynge is contayned in a peny, & that is as ye know 4 times, then multiply accozdinge to the rule 8 by 4, and that maketh 32 whych be 32 farthinges, and so 8 d, maketh 32 farthynges.

An other example. Here is a summe of 28 li. and 6 s. I would haue thys pownes, which is moze of denominacion reduced to the shyllinges, whych be of lesse denominacion: then loke fyrste howe ofte a shyllynge is contayned in a pounde, and that is 20 tymes, foz 20 s. maketh a li. multiply then the 28 li. by 20, therof cometh 560, whyche be all shyllynges: to this put the other 6 shillinges and so all is 566 shillinges.

But

¶ But ye shall note that where there be any summe of meane denominacyons betwene the moze to be reduced & the lesse (to whome reduccyon is made: then shall it be ealyar to reduce fyrste the moze to the meane, and so by the meane to the lesse.

¶ The example. 43 li. 19 s. 20 d. 4 farthynges. yf ye wyll reduce all thys summes to the farthynges: then shall it be better for you to reduce the poundes first to shillinges and then beynge shyllynges to reduce them to pens, and at the laste to farthynges: so by youre rule 43 pownde maketh 860 shyllynges, to that adde the 19 shyllynges, it maketh 879, then reduce thys 879 shyllynges to pens: loke fyrste howe many pens are contayned in a shyllynge. and that is 12, multyplye 879 by 12 therof commeth 10548 whych be al pens, to this adde your 20 pens, & that maketh 10568 then reduce this pens to farthinges, se how many farthinges be in a peny ỹ is 4, multiply 10568 by 4 cometh 40272

to

to these adde the 4 farthinges and that maketh 42279 farthinges. Thus haue ye reduced 43 li. 10 s. 20 d, 4 farthinges ỹ moze by the meane to the lesse.

¶ To reduce the lesse to the moze.

¶ First marke how many times the moze doth contayne the lesse: and by that number diuide the lesse, and the quocient sheweth the lesse reduced to the moze.

Example. I would haue this sum 5600 s, reduced into pownds: foz howe manye tymes a pownde doth contayne a shilling that is 20 times, then diuide 5600 by 20 ỹ quocient shalbe 280, whiche be pownds: so that 5600 s. reduced to pownds maketh 280 li. and so likewise in all other rekeninges.

¶ When summes of dyuers denomynacyons come in addition to be added togither, then begynnynge at the summes of least denominaciõ: adde them euer togyther tyll suche tyme as they make a number of the nexte denominacyon, and that that remayneth not able to make any nũber of greater denominacyon, set it vnder

the

the line, and procede to the next summe of greater denomination, to the whice adde the number of the same denomination reduced out of the sum before of the lesse denomination, so proceading to the end.

¶ Example.

li.	s.	d.	far.
1680	10	5	3
8300	29	7	2
2008	3	10	3

¶ Begyn at the least whych be farthynges: sayinge 3 and 2 ben 5, and 3 ben 8 this 8 farthinges make 2 pens, therfore take this pens and adde them to the next sum whych is of the same denomination, sayinge 2 and 10 be 12. d. whiche is 1 shylyng the 7 and 5 be 12 whyche also maketh 1 shillinge, so amonge these pens ye haue 2 shillynges to be added to the next order of shillynges, sayinge 2 and 3 be 5, and 9 be 14, put the dygget 4 vnder the lyne, and reserue the article 1 to the next place sayinge 1 and 2 is 3, and 1 is 4, sette that 4 vnder the lyne also, aud then is it 44s the whych reduced to poundes, maketh

2li. and 4s. remayneth vnder the tytle of shillinges: then put that 2li. to the other poundes, and so hast thou done in reduction of the summes of lesse value to the greatest sūme, which be poūdes. And thys is sufficientlye entreated of reduction.

Here foloweth of progression.

PRogression sheweth the nūbre whā it beginneth at 1 or at 2 in mounting alwayes by one and one, as dothe this number 123456789.

Now if ye wyll knowe the valure of the numbers, first ye must regard two thynges, that is to wit, if the number procede continually without leuynge any thynge betwyxt, as here 1234567, or if it leaue any thing betwixt, as here, 13576.

Secondly ye must consider if the number be euen or odde. And after these two considerations, then by foure rules that here foloweth ye may know the valure of eche whole number.

¶ The fyrste rule is whan one number pro-

proceadeth in mounting alwayes continually in the begynninge, than if it ende in an euyn number, than shall we take the halfe of that euyn number, and by it wee shall multiplye the odde number that cõmeth of the euen number, as ye may se in this ensample folowyng.

¶Ensample.

1 2 3 4 5 6 7 8

4

9

36

¶If ye wyll knowe how much this nũber is wozth than multyply the halfe of 8 that is 4 and the number that is after 8 is 9, and than therof commeth 36, and so muche is the summe wozth, and thus may ye do wyth all such like questions.

An other example.

1 2 3 4 5 6 7

4

7

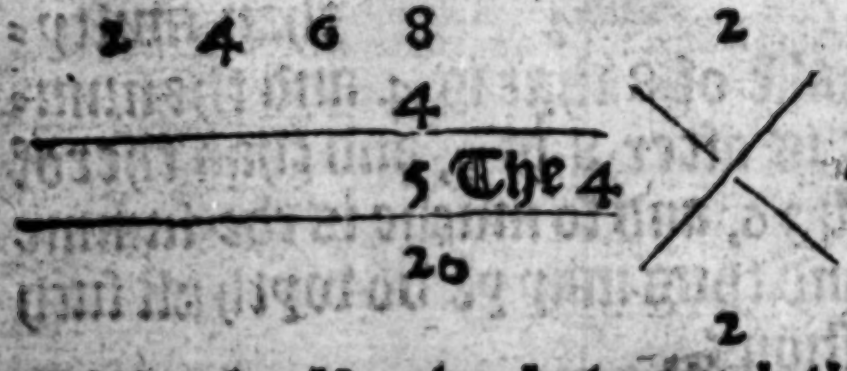
11

For

¶ For to multiplye this number 7 wherin the greatest and the moze halfe is 4 ye must multiplye 7 by 4 and it is 28, and so much is in the hole summe.

¶ The third is, if a number pzocede not continually, and ende in an euen number ye shall take the halfe of the sayd number that is euen, and by hym multiply ỹ same that is nexte commynge after the same halfe, and in thus doyng, ye shall haue the summe of the same number.

An example.



¶ If ye wyl knowe how much this number is wozth, then take the halfe on 8 that is 4, than multiplye by the 4 the number whych foloweth, that is 5 in sayinge 4 times 5 is 20, and so much is wozth the hole summe.

¶ The fourth is whan the saied number proceadeth not continually, then if it end

in

in an odde number, ye shall take the halfe of the sayd number that is odde, and multyply it by it selfe.

¶ An other example.

1 8 5 7

4

4

16

The false proue.

¶ Yf ye wyll knowe how much is worth this number, then take the greater halfe parte of 7, whyche 7 is the odde number and the greater is 4 then multyplye the same 4 by hym selfe in sayinge 4 tymes 4 is 16, and so muche is worthe the sayde number. And thus ye maye do wyth any other suche lyke questyons.

¶ Yet is there another progressyon, and it is also a maner of duplycacion as here after shal appeare.

1 2 4 8 16 32

¶ Now yf ye desyre to make a summe of these, do nothyng els but double the last fygures as 32 and 32 is 64, and thereof subtra 1, and there resteth 63, and that is the summe, and it is done.

¶ The rules of fraccyons.

In fraccions there be two maners of numbers, wherof the fyrste is called the numerator, for he sheweth ꝯ nũber of the denominator, that standeth vnder hym. The other is called the denominator, for she sheweth euer how much the part is, and standeth euer vnder the numerator, and ye maye make betwene thẽ both a lyne yf it please you, as appeareth in these ensamples folowynge.

Seuen by 9 departed ye shall set thus $\frac{7}{9}$

And 1 by 2 departed thus $\frac{1}{2}$

And 1 by 4 departed thus $\frac{1}{4}$

¶ Numeracion.

Numeracion is the first espeche, and it is nothyng els but that ye must euer set the lesse summe aboue & the more summe vnderneth, as by these ensamples folowynge is shewed.

1	1	1	2	6	6	3	4	5	6	8
2	5	9	3	7	10	4	6	9	8	14

¶ Of addition in broken.

If ye wyll adde two or thre, or foure broken numbers together ye muste marke whether ỳ numbers be one denominatiõ as these $\frac{1}{3}$ & $\frac{2}{3}$ yf they be al of one name, than adde them together in saying 1 & 2 is 3, set the 3 aboue 3, and that is 1 hole. Now adde $\frac{2}{5}$ $\frac{4}{5}$ & $\frac{3}{5}$ togither and set them thus $\frac{9}{5}$ they make 1 and $\frac{4}{5}$

Nowe wyll ye adde broken and vneuen numbers as $\frac{2}{3}$ to $\frac{3}{4}$ then multiply them crossewyse and saye 3 tymes 3 is 9, and 2 tymes 4 is 8, adde that 8 to 9 and it is 17, then multiplye the numbers togyther in sayinge 3 tymes 4 is 12 sette that 12 vnder 17 as thus $\frac{17}{12}$ that is 1 and $\frac{5}{12}$

¶ When there cometh moze broken numbers then two at ones, as in this ensample, yf you wolde adde $\frac{5}{4}$ $\frac{5}{6}$ to $\frac{4}{5}$ them make the two fyrst numbers after ỳ rule

afore sayd, & it commeth to $\frac{240}{24}$ Now adde $\frac{29}{24}$ to $\frac{4}{5}$ and multiplye them crosselwyse in sayinge 5 tymes 48 is 240, then 4 tymes 24 is 96, therto adde 240, commeth 336, sette them aboue the lyne, then multyply 5 with 24 cõmeth 120, set them vnder the lyne, and they standeth thus, $\frac{336}{120}$ that is 2 and $\frac{96}{120}$ Now adde me $\frac{1}{2}$ and $\frac{3}{5}$ to $\frac{4}{7}$ then saye 2 tymes 3 is 6 and 5 times 1 is 5 adde them together, for the tellers and sette it aboue the lyne, then multyplye the two nũbers together in saying 2 tymes 5 is 10, sette that 10 vnder 11 as thus $\frac{11}{10}$ Now adde $\frac{11}{10}$ to $\frac{4}{7}$ multyplye them crosselwyse lyke as ye dyd in the ensample before & ye shall haue $\frac{147}{70}$ whiche is 1 and $\frac{77}{70}$ and thus ye shall do wyth all other.

Subtraction.

Wyll you subtra broken from broken then ye must marke whether the nũbers of the same brokẽ be like in denomination or not and if they be lyke of name, then euer subtra ỹ lesse teller oute of the more, and set the number vnder the teller. As for example, yf ye wyll subtra $\frac{5}{10}$ from $\frac{1}{10}$ then subtra the vppermost 5 out of 7 and there resteth 2, set ỹ 2 aboue 12 as thus $\frac{2}{12}$ that is $\frac{1}{6}$ but when there commeth broken and vneuen numbers, as these $\frac{5}{13}$ from $\frac{5}{9}$ then multiplye both the numbers togyther in sayinge 9 tymes 13 is 73. Then multiplye crossewyse the numbers with the tellers, in sayenge 13 tymes 5 is 65 from 9 tymes 9 is 54, nowe subtracte 54 frome 95 and there resteth 11, that 11 set aboue 78 as thus $\frac{11}{78}$ Nowe wyll ye subtra $\frac{1\ 3}{3\ 4}$ from $\frac{2\ 4}{3\ 5}$ breake eche togethe and commeth to $\frac{12}{12}$ and $\frac{22}{15}$ then multiplye the number in sayinge 15 tymes

mes 12 is 180, then multyplye them crosse wise in sayenge 12 tymes 22 cometh 264. then saye 15 tymes 13 commeth 195, nowe subtra this 195 from 264, and there resteth 69 which 69 set aboue 180 as thus 60 and it is done.

100

1	1	6	1	1	1
6 from 0 is		36	3 from 4 is		12

¶ Multiplication in broken.

If ye wyll multyply $\frac{6}{7}$ with $\frac{12}{16}$ then multiply the vppermoste fygures to gyther in sayinge 6 tymes 13 is 78, then multiplye the nethermooste togither in sayinge 7 tymes 16 is 112, the whyche ye shall set thus $\frac{78}{112}$ that is $\frac{30}{56}$ Nowe wyll ye multyplye broken with the hole, as with $\frac{6}{1}$ then saye 2 tymes 6 is 12 and 5 tymes 1 is 5 sette them thus $\frac{12}{5}$ And when that the vppermost number is more then ỹ nethermost, then ye shall diuide it with the nethermost, & that that cometh therof is

$\frac{2}{5}$

is the whole, as thus diuide 2 with 5 com
meth 2 hole & $\frac{2}{5}$ Nowe wyll ye multyply
the hole & broken with the broken as $7\frac{2}{4}$
with $\frac{5}{8}$ then multiply them with 7 com=
meth 28 and adde 3 therto commeth $31\frac{}{4}$
Now make it after the fyrst rule, in say=
enge 5 tymes 31 is 155, and 4 tymes 8 is 32
set them thus $\frac{155}{32}$ that maketh $4\frac{27}{32}$ and it
is done.

$\frac{1}{3}$ and $\frac{1}{4}$ is $\frac{1}{12}$ $\frac{2}{3}$ and $\frac{6}{8}$ is $\frac{12}{24}$

Diuision in broken.

The number yͤ ye wyl diuide set euer
at the lyfte hand, & that ye wyll de=
uide withall set at the ryght hande
As when ye wyll deuyde $\frac{4}{5}$ with $\frac{2}{3}$ And
ye shall multiply the broken crossewise in
sayenge 3 tymes 4 is 12 yͤ is the hole that
ye wyl deuyde, then multiplye 5 wyth 2
cometh 10 that is $\frac{12}{10}$ maketh $\frac{12}{10}$ And when
that ye wyl deuyde broken with hole as
$\frac{5}{}$ with 4 then set your fraccyon and hole

thus $\frac{34}{7\ 1}$ nowe multyplye 1 wyth 3 that is the hole whych must be diuyded, then multyply 4 wyth 7 & it maketh 28 which must be set thus $\frac{3}{28}$ and it is done. But yf ye may diuyde the teller iust wyth the whole that were lyghter, as $\frac{18}{19}$ in 6 whol therfore diuide 18 is 6 maketh 3 & whych ye shall set thus $\frac{3}{19}$ Nowe wyll ye knowe what broken of broken is, as $\frac{2}{5}$ of $\frac{3}{4}$. Fyrst ye shall multyplye the vppermooste fygures one wyth another sayinge 2 tymes 3 is 6 and then the vppermooste in sayinge 3 tymes 4 is 12 that maketh $\frac{6}{12}$ that is $\frac{1}{2}$. Item $\frac{6}{7}$ of 128 $\frac{2}{3}$ multiplye 128 with 3 and adde there 2 commeth 386 whych set thus $\frac{286}{3}$ then multiply them with 6 cometh 2316 then multiply the vndermooste altogether saying 3 tymes 7 is 21 and 2 tymes 21 is 42 therwith dyuyde 2316, and it is done.

A table very necessary for multiplication.

1 tyme	1 maketh	1		3	9		27
2	2	4		3	10		30
3	3	9		4 tymes	5		20
4	4	16		4	6		24
5	5	25		4	7		28
6	6	36		4	8		32
7	7	49		4	9		36
8	8	64		4	10		40
9	9	81					
10	10	100		5 tymes	6		30
2 tymes	3 maketh	6		5	7		35
2	4	8		5	8		40
2	5	10		5	9		45
2	6	12		5	10		50
2	7	14		6 times	7 maketh		42
2	8	16		6	8		48
2	9	18		6	9		54
2	10	20		6	10		60
3 times	4 maketh	12		7 tymes	8		56
3	5	15		7	9		63
3	6	18		7	10		70
3	7	21		8 tymes	9 make		72
3	8	24		8	10		80
				9 tymes	10 make		90
				1 tymes	11 make		11
				2	11		22

3	11	33
4		44
5		55
6		66
7		77
8		88
9		99
10		110
1 time	12 maketh	12
2	12	24
3		36
4		48
5		60
6		72
7		84
8		96
9	12	107
10		120
1 tyme	13 maketh	13
2	13	26
3		39
4		52
5		65
6	13	78
7		91
8	13	104
9		117
10		130
1 tyme	14 make	14
2	14	28
3		42
4		56
5		75
6		84
7		90
8	41	112
9		126
10		140
1 tyme	15	15
2	15	30
3		45
4		60
5		75
6		90
7		105
8		120
9		125
10	15	150
1 tyme	16 maketh	16
2	16	32

3	16	48
4		64
5		80
6	16	96
7		112
8	16	128
9		144
10		160
1 tyme	17	maket 17
2		34
3		51
4	17	68
5		85
6		102
7	17	119
8		136
9		153
10		170
1 tyme	18	18
2		36
3		54
4		72
5		90
6		108
7	18	126
8	18	144
9		162
10		180
1 tyme	19	make 19
2		38
3	19	57
4		76
5		95
6		114
7		133
8	19	152
9		171
10		190
1 tyme	21	maket 21
2		42
3		63
4		84
5		105
6	21	126
7		147
8		168
9		189
10		210
1 tyme	22	maketh 22
2		44

3	22	66	8	24	192		
4		88	9		216		
5		110	10		240		
6	22	132	1 tyme	25	make	25	
7		154	2			50	
8	22	176	3	25		75	
9		198	4			100	
10	22	230	5			125	
1 tyme	23	23	6			150	
2		46	7			175	
3		69	8	25		200	
4		62	9			225	
5		115	10			250	
6		138	1 tyme	26	make	26	
7	23	161	2			52	
8		184	3			78	
9		207	4			104	
10		230	5			130	
1 tyme	24	make 24	6	26		156	
2		48	7			182	
3		72	8			208	
4	24	96	9			234	
5		120	10			260	
6		144	1 tyme	27	maket	27	
7	24	168	2			54	

3	27	81
4		108
5	27	135
6		162
7		189
8		216
9	27	245
10		270
1 tyme	28 maket	28
2		56
3		84
4	28	112
5		140
6		168
7		196
8	28	224
9		252
10		280
1 tyme	29 maket.	29
2		58
3		87
4	29	116
5		145
6		174
7		230
8		222
6		261
10	29	290
1 tyme	31 maketh	31
2		62
3		93
4	31	124
5		155
6		186
7	31	217
8		248
9		279
10		310
1 tyme	32 maketh	32
2		64
3		96
4	32	128
5		160
6		192
7	32	224
8		256
9	32	288
10		320
1 tyme	33 maketh	33
2		66

3		99
4	33	132
5		165
6		198
7		131
8	33	264
9		297
10		330
1 tyme	34 make.	34
2		68
3		102
4	34	136
5		170
6		204
7		238
8		272
9	34	306
10		340
1 tyme	35 maketh	35
2		70
3	35	105
4		140
5	35	175
6		210
7		245
8		280
9		315
10	35	350
1 tyme	36 maketh	36
2		72
3		108
4	36	144
5		180
6		216
7	36	252
8		288
9		324
10		360
1 tyme	37 maket	37
2		74
3		111
4	32	148
5		185
6		222
7	37	259
8		296
9	37	333
10		370
1 tyme	38 maketh	38
2		76

3	38	114
4	38	152
5		190
6		228
7	38	266
8		304
9		342
10		380
1 tyme	39 maketh	39
2	39	78
3		118
4		156
5		195
6		234
7		273
8	39	312
9		351
10		390
11 tyme	11	121
12	12	144
13		169
14		195
15		225
16	16	256
17		289
18	18	324
19		361
21 tyme	21	441
22	22	484
23		529
24		576
35		623
26		676
27		729
28	28	784
29		841
31 tyme	31	961
32	32	1024
33		1079
34		1156
35		1225
36		1296
37		1396
38	39	1444
39		1529
41 tyme	41	1681
42	42	1764
42		1849
44		1936

45	45	2025
46	46	2119
47	47	2209
48		2304
49		2401
51 tymes	51	2601
52		2704
53		2809
54	54	2916
55		3035
56		2136
57		3249
58		3364
59		3481
61 tymes	61	3721
62		3844
63		3969
64		4096
65	65	4225
66		4356
67		4489
68	68	4924
69		4761
71 tymes	71	5041
72		5148
73	73	5329
74		5476
75		5625
76		5776
77	77	5929
78		6084
79		6241
81 tymes	81	6561
82		6724
83		5889
84	84	7056
85		9225
86		7396
87		5766
88	89	7744
89		7921
91 tymes	91	8281
92		8464
93		8649
64		8836
65		9025
69		9216
97	97	6409
98		6604
99	99	9801

Here folowyth the rules, and fyrst the rule of thre.

Multiply by the contrary & diuide by the semblaũt or like. This rule maye be vnderstande in two maners. Fyrste multyplye the same that ye wyl bye by his contrary, that is to witte, by the price, and diuide by the semblaunt that is to witte, by as muche as ye haue bought: or thus, multyplye the price by his contrary, that is to witte, by the same that thou wylt bye, and diuide it by hys semblaũt, that is that same that ye haue bought. And note ye why it is called the rule of thre, for wyth the nũbers certayn ye may knowe and fynde the fourth nũber vncertayne. And it is a rule right notable and necessarye in the fayct of marchaũdise. For to haue knowledge of this rule it behoueth to set some rules dyfferent in maner of questions, and fyrste in measures longe.

¶ The rule of hole numbers.

¶ Yf 9 elles of cloth cost 25 crones, howe

much shall cost 15 by the price. Answer. It behoueth you to set the somme, that is to wyte, 25 crones. And thē ye shal multiply by his contrary, that is to wite, by 15 that ben 375, and then diuide them by that sē-blaunt, that is to wite, by 9, and therof co meth 41 crones and an halfe. and there re mayneth 1 crone and an halfe, the whych ye shall make in ʃz. and there ben 54 ʃz. ỹ whych ye shall deuyde by 9 and therof co-meth 6 ʃz. Therfore ye may answere that the 15 elles shall cost 41 crones & an halfe, and 6 ʃz. Nowe yf ye wyl make the proue it behoueth you to forme youre questyon thus yf 15 elles cost 41 crones and an halfe and 6 shyllynges, howe much shall coste 9 elles by the price. Then it behoueth you fyrst to multyplye the 6 ʃz, by 9 & that ben 54, then it behoueth you to make thereof crones, that is 1 crone & an halfe, & then ye shall multiplye the 41 crones and an halfe by 9, and they ben 373 crones and an halfe, and then set thereto 1 crone and an halfe, and they be 375 crones whyche ye shall deuyde by 15, that ben 25, the whyche

ben the pryce of 9 elles, and so the rule is good, and thus ye may do of all other semblable.

¶ The secõde rule of hole numbers with numbers broken semblable.

¶ If 10 elles and 2 thyrd partes of cloth cost 35 franc. how muche shall coste 14 elles by the pryce. Answere. For to knowe this rule and other semblable, it behoueth you to reduce the elles bought, and them that ye wyll bye all into thyrdes by cause of them that be bought, in sayenge thus, 3 tymes 10 ben 30, and set therto 2 thyrdes, that is than 32 thyrdes. Then it behoueth you to make deuision by 32, and than ye shall reduce the 14 elles in to 1 thyrde, in sayinge 3 tymes 14 bene 42. Then 42 shall be the multiplicatour. Now sette the summe, that is to wytte 35 franc. the whyche multyplyed by 42 be 1470 the whiche diuided by 32 therof cometh 45 francz. and an halfe, and there resteth 14 fra. the which ye shal reduce to

shyllynges, and than deuyde them by 32 and therof commeth 8 shillynges, and an halfe, there resteth 8 shyllinges, and than shall ye make them in pens, and deuyde them by 32, & therof cometh 3 pens, therfore ye may aunswere that the 14 elles of clothe shall coste 45 francz and an halfe 8 shyllynges and an halfe and 3 pens.

¶ For to make the proue it behoueth you to make your worke by the contrary, for it behoueth you to multiplye the summe that the 14 elles cost by the deuisor, and dyuide it by the multiplicatour. Therefore sette the summe vpon the lifte syde, and fyrst multiplye the 3 d, by 32, & whan they be multiplied ye shall make of them shyllynges, and then ye shall multyplye the 8 s3, and the half by 32, and then make therof francz. And then ye shall multiply the 45 francz and the halfe by 32, and deuyde them by 42, and so ye shall know yf the rule be well made.

¶ The thyrde rule of hole numbers with dyuers minutes.

yf

¶ Yf 4 elles and 2 thyrdes of cloths cost 10 crones, how muche shall cost 6 els and 2 quarters bi the price. For to know this rule, it behoueth you fyrst to reduce the 4 elles and 2 thyrdes thus, 3 tymes 4 bē 12 And than ye shall adioyne the 2 thyrds, & than it is 14. And than the elles that ye wyll bye, ye shall reduce theym in to one fourth thus, 4 times 6 ben 24. And then set the 2 quarters therto and thā ther is 26 quarters. And than ye shall multiplye that one by that other, that is to wyt the numbraunt of the fyrst by the denomināt of the seconde, in sayinge 4 times 14 ben 56. And those 56 shalbe the deuisor. Then multiply the numbrant of the seconde, by the denominant of the fyrst in sayinge 3 tymes 26 ben 78, and those 78 shalbe the multiplicator. And therfore set 10 crones and multyplye them by 78, and deuyde them by 57. And ye shall fynde that the 6 elles and 2 quarters coste 13 crones & an halfe, 15 shyllynges and 5 pens. And there resteth 8.

¶ The example.

56 142 242 78

10 crones 246 2

3 4

¶ If 4 elles $\frac{2}{3}$ coste 10 crones, 6 elles $\frac{2}{4}$ shall cost 13 crones and an halfe 15 shyllynges 5 pens, there resteth 8.

For to make the proue it behoueth you to worke the cõtrary, for it behoueth you to multiplye the summe by the dyuysour, that is to wytte, by 59, and make diuision by the multiplicatour, that is to witte, by 78 and ye shall fynd 10, otherwyse if there be more or lesse the rules be false.

¶ The fourth rule contayning hole numbers to the marchaundyse that ye haue bought and minutes to the same that ye wyll by.

¶ Y f 8 elles of cloth cost 15 crownes, how much shall cost two quarters by the price For to know this rule ye must reduce the 8 elles into quarters, in sayinge 4 times

8 ben

8 ben 32 then 32 shall be the deuysor, and the 2 quarters shalbe the multiplicator. Now set the 15 crones and multiply them by 2 quarters, and dyuyde by 12 and ye shall fynde that the 2 quarters cost 6 crones and the halfe 15 shyllynges and an halfe 3 pens. For to make the proue ye must worke the contrary, for ye shall multiply the somme that the 2 quarters cost, that is to wytte, 6 crones, and the halfe 15 sh. and an halfe 3 pens by 32 and diuyde them by 2.

¶ The rule of rounde measures, that is to wyte, measure of corne of wyne and oyle.

¶ Fyrste it behoueth you to presuppose and knowe the measures of corne.
¶ One muy is worth 12 septiers.
¶ One septiers is worth 4 minutes.
¶ One minot is worth 3 busshels.
¶ The busshell is worth 4 quarters.

¶ The measures of wyne.

¶ One muy of wine holdeth 36 septyers

¶ The septyer holdeth 4 quarters.

¶ The quarte holdeth 2 pyntes.

¶ The pynt holdeth 2 choppynes.

¶ The choppyne 2 halfe septiers.

¶ The halfe septer 2 possions.

¶ The fyrst rule.

¶ If the muy of corne costio francz, how much is worth the bussthel. Answere. For to knowe thys rule ye must knowe how many bussthels bene in 1 muy. Therfore multiply the muy by 12, and then by 4, & then by 3, whych bene 144 bussthels, the whyche shall be the deuysor of 10 francz therfore diuyde 10 by 144. And therof cõmeth 1 sz 4, d. and an halfe, resteth 24. d. Therfore the bussthell costeth 1 sz. 4 pens and an halfe, resteth 24 d.

¶ The seconde rule.

¶ To the contrary, yf the bussthell coste 2 sz. how muche shall cost a thousande, and 4 hundreth Muys by ỹ pryce. Answere, For to knowe this rule, it behoueth you

to

to make all the Muys in buſchels. And there be 201600 buſchels, the whych behoueth you to multyplye by 2, and there be 403200, and of thē ye ſhall make crones. Therfore deuide by 30, & there ben 11200 crones. Therfore ye may aunſwere that yf the buſchell coſt 2 ſz. a thouſaunde and 4 hundreth muys ſhall coſt enleuen thouſand and 2 hundzeth crones, and thus ye may do of all other ſemblable.

¶ The thyzd rule.

¶ If the ſeptier of cozne be wozth 20 frācz & the loſe of peny tozneis weight 12 ounces, how much ought it to weigh when ỹ ſepter is wozth 15 tozneis. Anſwer. Multiply the fyzſt nūber by the ſeconde, that is to wytte, 20 by 12, and deuyde it by 15, & ye ſhall fynd ỹ it oughe to weygh 16 ounces. And thus ye may do of al other lyke.

¶ If the muy of wyne be wozth 12 francz howe much oughte the pynt to be worth Aunſwere. Foz to know this queſtion, it behoueth you to reduce the 12 muys into ſeptyers, from ſeptyers into quarters, &

from quarters into pyntes, and that ben 288 pyntes. And then ye shall reduce the 12 francz in to sz. that bene 240, and that into pens, that bene 2880 pens, the whyche behoueth you to deuyde by 288 and it cometh to 10 d. Therfore yf ỹ muy of wyne cost 12 francz, the pynt is worthe 10 d. But it is requisite that the Tauerner haue some gaynes yf ye sell 12 d. the pynt. I demaunde howe muche shall he winne vpõ the muy: Answer. He selleth it 2 d. more then it is worth therfore multiply 288 pyntes by 2 and they be 576, the whych ye may deuyde by 12 and ther shal be 48 sz. Therfore may ye answere that he getteth 48 sz. vpon the muy.

¶ If the muy cost 10 francz how much is worth the pynt. Answere. It behoueth you to do as is aboue sayde: and ye shall fynd that it is worth 8 pens and 1 thyrd.

¶ If the pynt cost 6 pens, how much shal cost 12 muys by the pryce Aunswere. It behoueth you to know how many pintes ben in a muy, that is 288, multyplye 12 muys by 288 that is 3456 pintes. And than

than multiply the pyntes by 6 that bene 20736, of whome ye shall make ſz by dyuy ſion, and there ben 10728 ſz, and of shyl= lynges ye shall make francz. Therefore ye shall make diuiſion by 26, ye shall fynde 86 francz 8 ſz. Therefore ye maye aun= swere that the 12 muys shall coſt 86 frau= cz 8 ſz.

¶ In ſo muche as competently we haue tracted of the rule of thre in the fayet of meaſures, it is expediente that we tracte therof in the fayete of weyghte.

¶ Y f an hundreth poundes of peper coſt 20 ſz, how much shall coſt 6 pound by the price. Aunſwere. For to knowe thys que ſtion, ye muſt multyply by the contrarye and deuyde by the ſemblaunt, that is to wytte, multiplye by 6 and deuyde by 10, and ye shal fynde that the 6 poundes shal coſt 1 francz, and 4 ſz. To make the proue ye muſt multiplye by 100 and diuide by 6. Now I demaund yf the 6 poundes coſt 1 franc 4 ſz, how moch is worth the ounce.

For

For to knowe this ye shal make the poun
des in ounces, the whiche ben 96 ounces
& then make the money in pence, & which
ben 288 d. the which ye shal deuide by 96
and therof cometh 3 pence, therfore the
ounce shall cost 3 pence.

¶ If one li of saffron cost 3 francz and an
halfe, how much is worth the ounce. An
swere. It behoueth you to know that in
a pounde ben 16 ounces, therfore deuyde
the 3 francz, and the half by 16 and ye shal
fynde that the ounce is worth 4 ſz 4 d. &
an halfe, & thus ye may do of other lyke.

¶ If 4 pounde of saffron cost 16 fra. 6 ſz.
8 d. how much shall cost 3 quartrones by
the price. For to know this rule, ye shall
reduce 4 li. in thyrdes and shall saye 3
tymes 4 ben 12, and 1 thyrd ben 14 thē ye
shall multiply by 4, and shall say 4 times
14 ben 56 the deuysor, than for the second
number we shall say, 3 tymes 3 ben 9 four
thes or quarters, the which 9 shall be the
multiplier. Now set the 16 francz 6 ſz 8 d.
tournoys, & multiply them by 6 and de-
uyde them by 16, and therof cometh 2 frā

and

and an halfe, 2 ſz. 6 d. therfoze ye may anſwere that the 3 quarters ſhal coſt 2 fran. & an halfe 2 ſz. 6 d. Foz to make the pzoue ye muſt wozke by the contrary in mulcyplyinge by the deuyſoz, that is to wyt by 56 and make diuiſion by 9, and ſo maye ye do of other ſemblable.

¶ If one pound of tin coſt 9 blãces, howe manye hundzeth ſhall I haue foz a thouſand and 4 hundzeth francz. It behoueth you to know how much is wozth ỹ hunderth by 9 blances the pound. And ye ſhal fynde that there is 12 francz and an halfe. Now make diuiſion of 1400 frances by 12 frances and an halfe, ye ſhall fynde, 112 Therfoze ye maye ſaye that I ſhall haue 112 pound of tynne foz 1400 frances.

And alſo as we haue made this rule, ye maye do in all other marchaundyſes, as in lead, yzon, ſpyces peper, ſuger. And as we haue done of poundes ye maye do of quartrons, ounces, & al other weyghtes

A rule which is without tyme.

Thze marchauntes put theyz monye togyther foz to haue gaynes ỹ wholy-

che

che haue bought suche marchaundyse as hath cost 125 francz, wherof the fyrst hath layde 25 francz. The seconde 64 francz and the thyrde 36, fz. And they haue gotten 54 franc. of cleare gaynes. I demaūd how shal they deuide it, so that eche man haue gaynes accordynge to the moneye that he hath layd downe. Answer. In al suche rules and questions ye shall multiply eche one after the money that he had layde, therfore multiplye the gaynes for the first by 25 and deuide by 125, that is the diuisor commune. For the seconde multiply the gaynes by 64, and diuide by 125 the diuisor commune. And for the thyrde multiply the gaines by 36, and dyuyde 125 the deuysor commune. And for to fynd the deuysor commune, ye shal set togither the multiplicatours, that is to wit, 25, 64 and 36 which is 125 the deuysor commune And so shall ye do in al rules of company Now ye maye fynde & know how much eche one hath of gaines, and ye maye se it by the ensawple here present.

The fyrste hath 10 fz and halfe 6 fz. The seconde

seconde hath 27 fz & halfe 2 fz. and halfe 5 d. & halfe, resteth 2d. and halfe. The third hath 15 ſ and halfe 5 fz. resteth 60 pens.

256436 125

Multiplicatour . Dyuysour.

And they haue yet to be dyuyded among them of restes 62 d. and an halfe.

¶ For to make the proue it behoueth you to dinyde the restes, and then reduce all togethers, and ye shall fynde the summe diuided for all the rules of company bene proued by addicion of sommes.

¶ The seconde rule of hole tyme.

¶ Foure marchauntes laye money together for wynnyng for a certayne tyme, of whome the fyrste hath layde 10 fz. for two yere. The second 20 fran. for 3 yere. The thyrde 100 francz for one yeare. And the fourth hath layde 40 franc. for 4 yeare: & they haue gayned 454 fran. I demaund how much eche one ought to haue of winnyng after the money that he hath layde, & after the tyme that he hath holde hys money in gayne for company. Aunswer.

for

For to knowe thys rule and other semblable, ye shall multiplye the money that eche one hath layde by the tyme that he hath holden it in companye. Example. The fyrst hath layde 10 fran. for 2 yeare, therfore it behoueth you to multyplye 10 by 2 sayinge 2 tymes 10 bene 20. For the second 3 tymes 20 bene 60. For the third 1 time 100 is an 100. For ỹ fourth 4 times 40 ben 160, & thẽ it behoueth you to finde a dyuisor comune, for eche hath his multiplicator, that is to witte, the same that he hath layde, and for to fynde it ye shall sette together all the multiplicatours, ỹ is to witte the 20, 60, 100, 160 the which maketh 340, therfore these 340, shall be the deuysor commune to all, thenne how muche eche one oughte to haue ye maye se by the ensample here folowyng 494 ſz
The fyrste hath 20 francz and halfe 4 ſz. one peny resteth 140. d.
The seconde hath 80 frances 2 ſz 4 d. rest 20. pens,
The thyrd hath 134 frances 1 ſz. 5 pens, reste 20 pens,

The

The fourth hath 213 franc. and an halfe
& and a halfe d. reſt. 100 peng.

20, 60, 100, 160, 340

Multiplicatours, Dyuyſour.

Of reſt they haue to deuyde one peny.

¶ The rule of company where as is hole tyme and partes of tyme.

THre marchauntes lay money in com
pany for to haue gaynes thereby, of whome the fyrſte hath layde 30 frances for two yeares. The ſecond hath layd 46 fran. for one yeare & thre monethes. And the thyrde hath layde 60 fran. for thre yeres & two monethes. And they haue gained with this money 44 fran. I demaũd howe they ſhal deuide it to the ende, that eche one haue his ryght after the money and the tyme that they haue ſet and holden for to gayne. Anſwer. For this rule & all other ſemblable, ye ſhall multyplye the tyme by ꝑ money, as we haue ſayd aboue but for as much as there be monethes ye muſt ſet & reduce all the tyme of eche one in monethes, and alſo yf there were anye

dayes ye shuld set all the time in dayes. The fyrste hath layde 30 frances for 2 yeres, in 2 yeares ben 24 monethes, therefore multiplye 30 by 24 there bene 720, and these 720 shalbe the multyplycatour of the fyrste. The seconde hath layde 40 franc. for 1 yere and 3 monethes, in one yeare ben 12 monethes, and 3 doth make 15 monethes, multyplye 40 by 15, they make 600 whiche is the multiplicatoure of the seconde. The thyrde hath layde 60 francz for 3 yeares and 2 monethes, 3 yeares ben worth 36 monethes and 2 ben 38 monethes. Nowe multiplye 60 by 38, and ther ben 2280, which shal be the multiplicatour of the thyrd. Now for to haue a diuisor commune, ye shal set togither al the multiplicatours that is 3600 the diuisour commune. They haue to deuide 44 francz. The fyrst hath 8 francz, and halfe 6 sz rest 0. The second hath 7 frances. 6 sz and half. rest 0. The thyrde hath 27 fran. and halfe 7 sz, 4 pens, rest 0.

720, 600, 2280, Multiplicatours. 3600. Diuisour.

A

A rule of diuers syluer and dy-uers tyme.

Thre marchantes haue made cõpa-nye togider of whom the first hath layd 10 frances 4 shyllynges for 2 monethes. The second hath layd 15 fran. for one yere. And the thyrde hath layd 6 francz 7 ʃ3 for 8 monethes, and they haue goten of this money 24 franc. How they shall dyuyde it after the money and after this tyme I demaunde. Answer. For to knowe this rule and all other semblable it behoueth you to reduce the moneye of euery man in shyllynges. And all the tyme in monethes. And then multiplye the money by the tyme. Ensample, The fyrst hath layde 10 francz that ben 200 ʃ3. and 4 ben 204 the whiche ye shall multy-plye by 2 monethes, and they shal be 408 the multiplicatour of the fyrste. The se-conde hath layde 15 francz for one yere, & in 15 francz ben 300 ʃ3. and in one yere ben 12 monethes, therefore multiplye 300 by 12, and there shall be 3600 the multyply-catour of the seconde. The thyrde hath

layde 6 francz 7 shyllynges, and in 6 frā. ben 120 sz. and 7 ben 127 sz. for 8 moneths therfore multiply 127 by 8, and they shall be 1016 the multiplicator of ꝯ thyrd. And for to haue the deuysor comune, ye muste reduce together all the multiplicators, & that shall be the deuysor commune, as ye may se by the example folowynge. They haue 24 frances of wynnynge.

The fyrst hath 2 francz and halfe 8 sz. and halfe 5 pens and halfe resteth 1360 pence.

The seconde shall haue 17 francz, 3 sz. and halfe d. resteth 1952 pens.

The thyrde shall haue 4 sz. & halfe, 7 sz, 0 pens, & halfe resteth 17112 pens.

408, 3600, 1016 5024.

Multiplicatours. Dyuysor.

And they haue to deuyde 1 d. of the restes For to make the proue ye shall reduce to gyther the thre summes that they haue had. And if there be more or lesse the rule is euyll made.

Here foloweth the rule of companye of factours with marchauntes seruaūtes.

Of

Of this rule of factours ye maye make 3 rules in maner of questiõs that fall amonge marchauntes. Example, 8 marchauntes 5 factours, and 3 seruauntes or varlettes haue made companye together, and haue clearly gotten 150 fran. wherof the factours oughte to haue the halfe of the marchaumtes, and the seruaũtes the thyrde part of the factours, howe shall they deuyde these 150 franc. Answer For all suche rules and questions it behoueth you to fynde a number wherin is an halfe and a thyrde, and that shal be 6, and these 6 shalbe for the marchaunt. And the halfe of 6 ben 3, that shall be for the factours, and the thyrd part of the factours is 1 whiche shall be for the seruauntes. And than ye shall multiplye the one by ỹ other, that is to witte, the personages by theyr number, 6 tymes 8 ben 48, & these 48 shall be the multiplicator of the marchauntes. And that there ben 5 factours that haue 3 and 3 tymes 5 ben 15, and than there ben 3 seruauntes that haue 1, and 1 tymes 3 is 3, & therfore the factours shall

ye multiply by 15 and the seruauntes by 3. Now for to fynd the diuisor commune ye shall set togither all the multyplycatours, that is to wyt. 48, 15, 3, which bene 66 these 66 shalbe the diuisor commune.

Example they haue to deuide 150 francz The marchauntes haue 109 fra. 1 s3. and halfe 3 d. and halfe, resteth 21 d.

The factours haue 34 fran. 1 s3. and halfe 3 d. and halfe, resteth 21 d.

The seruauntes haue 6 fran. and halfe 6 s3. 4 d. rest 24 pens.

48, 15, 3 — 66

Multiplicatours — Diuisor.

¶ They haue to deuyde 1 peny of restes For to make the proue ye shall diuide all the restes by the dyuysor comune. And than ye shall reduce all togither, for to haue 150 frances.

¶ The rule of factours the whych gate the halfe of the gayne and of the prncypall.

¶ An other rule in maner of a question a marchaunt hath gyuen 50 franc, to hys factor by suche couenant that he gouerne them

them for 10 yeres. And at the ende of the tyme, that is to wytte, at the ende of 10 yeres. And at the ende of 10 yeres, they shall dyuyde the gaine and the principall It happeth that the factour wyll go hys waye at the ende of 6 yeres, and he fyndeth that he hath gayned a thousande francz. I demaund how ought the sayd factour to be payd, and how much ought the sayd marchaunte to haue: Aunswer. ye ought to regarde how much he shulde haue gayned in those 10 yeares that he shulde haue holden them in gayne as he had promysed. Therfore ye maye forme the question, yf 6 haue gotten a thousand howe muche shall be the gaynes of 10. Multiplye 1000 by 10 and dyuyde by 6 and ye shall fynde that he shoulde haue gotten 1666 fran, and an halfe 3 shyllyn. 2 pens. Of the whiche gaynes the marchaunt ought to haue the halfe that ben 833 frances. 6 shyllynges and halfe and 1 peny. And than take vp those 833 franc. 6 shyllynges and halfe 1 penye of 1000 franz that he hath gayned, and there re-

mayneth 166 frauces, 13 shyllynges 5 pens for the factour. Nowe ye maye aunswere that the marchaũt shall haue of the gaynes 833 francz 6 shyllynges, and halfe 18. And the halfe of the pryncypall, that is to wytte of 50, that is 25 and there bene 858 francz. 6 sz. and halfe 1 d. And the factour shall haue of gayn 166 francz. 13. sz. 5 pens. And of the pryncypall 25 that ben 121. fran 13 sz 5 d. And thus maye ye do of all other semblable. And it is proued by the reduction of the two sommes gayned.

¶ The thyrd rule of factours with couenauntes, that the factour shall gayne the halfe of the pryncypall.

¶ An other rule of company of factours & marchauntes with cõuenaunt that the factours shall gayne the halfe of the pryncypall and not of the gayne. Example. A marchaunt gyueth vnto hys factoure 400 fran. that he shall gouerne them foꝛ 6 yeres, & at the ende of the tyme the halfe of the pryncipall shall be to the factour. It happeneth the factour wyll go hys waye

at

at the ende of 2 yeres, & hath gayned 200 fran. I demaund how ought the factour to be payed. Answer. ye ought to regard howe muche he should haue gayned yf he had serued all hys tyme, and for to find it ye maye worke by the rule of thre, for ye must multyplye by hys contrary, that is to wytte by 6, and diuide by his semblaũt that is to knowe, by 2, in saying yf 2 haue gayned 200 frances: howe muche shall 6 gayne, and ye shall fynde that he shoulde haue gotten 500 franc, and he gayned but 200 franc. wherefore he oughte to make a gayn 400 fran. to the marchaunt: and he ought to haue the halfe of that principall, ỹ bene 200 frances, therfore he oweth 200 vnto the marchaunt, and so he hath lost al his time, and 200 fran. of aduauntage for the marchaunt ought nothyng to lose like as he had accomplyshed all hys tyme.

✠ The thyrd rule of chaunges for to vse deceyte or fraude.

¶ Two marchaũtes will chaunge their marchaũdise, & the one begyled the other

mayneth 166 frauces, 13 shyllynges 5 pens for the factour. Nowe ye maye aunswere that the marchaũt shall haue of the gaynes 833 francz 6 shyllynges, and halfe 18. And the halfe of the pryncypall, that is to wytte of 50, that is 25 and there bene 858 francz. 6 sz. and halfe 1 d. And the factour shall haue of gayn 166 francz. 13. sz. 5 pens. And of the pryncypall 25 that ben 121. fran 13 sz 5 d. And thus maye ye do of all other semblable. And it is proued by the reduction of the two sommes gayned.

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✠ The thyrd rule of chaunges for to vse deceyte or fraude.

¶ Two marchaūtes will chaunge their marchaūdise, & the one begyled the other

the one hath peper, and that other cloth. He that hath peper wyll sell for 25 franc. the hundereth by chaunge, whiche is no more worthe than 20 fran. in syluer contented. I demaund for how much ought the other to sell vnto hym the elle of hys cloth, that is worth but 15 ſh, to kepe hym selfe from losse. Answere. For the rule of thre ye maye saye thus, yf 20 frances of content geue me 25 franc. at the chaunge howe muche shall geue me 15 of contente. It behoueth you to multiplye the 25 by 15, whiche ben 373, the whiche ye shall diuyde by 20 and therof commeth 18 ſh. 9 d. therfore ye may say that he shall sell the elle of cloth for 18 shyllynges 9 d. And thus maye ye do of all other.

¶ Two marchauntes wyll chaũge theyr marchandyse, of whom that one hath 100 pounde of wolle, that is no more worthe but 15 crones. And he wyl chaunge with another in a piece of cloth that is worthe 21 crones, and he wyl gyue hym the woll for 17 crones. I demaunde for how much ought the other to sell the peice of clothe

to

to the ende that he be not betromped 1
Answer. By the rule of thre whan 15 are
worth 17 demaunde how muche shall be
worth 31. Diuide by 15 and ye shall fynde
the same that ye requyre.

¶ Two marchauntes wyl chaunge their
marchaundyse, and the one defraud that
other that hath peper, and wyll sel it 24
fran. the hundreth by chaunge, whiche is
no more worth but 20 frances in money
content, and he wyll haue the halfe in
money contente. I demaunde for howe
much ought the other to sel the elle of his
cloth that is no more worth but 15 sh. An-
swer, ye must take away the money con-
tent that the other demaũdeth, that ben
12 franc. for the iust price, & of the whiche
he wyll sell ouer. Therefore take awaye
and withdrawe 12 of 20 franc. which is ỹ
iust price, and there rest 8 franc. for 8 and
4 ben 12. And ye may saye by the rule of
thre, yf 8 gyue me 12, what shall gyue me
15 shyllyn. whiche is the iuste pryce of the
clothe, multyply 12 by 15 and diuide by 8,
& therof cometh 22 sh. 6. d. And therfore

the

the marchaunt ought to sel the elle of his cloth after 22 ſ 6 d. els he ſhold haue losse And thus ye ought to do of al maners of chaunges and barathes, for yf he ỳ hath the peper, demaunded but the thyrde or the fourth or 2 or 3, abate all onely ỳ same ỳ he shal demaunde, and then by the rule, as is sayd. And note ye wel that if he wil multiplye shyllynges, ye shall haue shyllynges. And of crones ye shall haue crones, and of frances ye shall haue frances. And in lyke maner of all other.

Here folowth many rules & questiõs to haue the more knowledge of ỳ science of arisme trike, and the fyrst is of collects and tallyages.

TEnne men owe vnto the kynge of collecte and talliage 244 fra. I demaũde how shall they diuide them to the ende that eche one pay after the valour of his goodes, for it is reason that more be payed by the riche then by the poure. For he that is more endeued with goodes is more holden vnto God and to

the

the pryce. Anſwer. It behoueth to know how muche eche one is worth in his goo des, and in his poſſeſſions.

The fyrſt is wourth 100 francz
The ſeconde is worth 400 franc.
The thyrde is worth 154 franc.
The fourth is worth 1000 fran.
The fyft is worth 1150 fran,
The ſyxt is worth 40 franc
The ſeuenth is worth 440 franc.
The eyght is worth 80 franc.
The nynth is worth 600 franc.
The tenth is worth 300 francz.

Nowe it behoueth you to fynde the mul typlycator and the deuiſor. The multy= plycator ſhalbe eche one by hym ſelf, and ſo for the fyrſt it behoueth you to multy= plye by 100, for the ſeconde by 400, for the thyrde by 154, and ſo muſt ye do of the o= ther. And for to fynde the diuiſor, ye ſhal ſette togither all the multiplicatours, as 100, 400, 154, &c. and all that togither ſhal be the diuiſor commune, which is 4464 Therfore multiplye the collect, that is to wytte. 244 for eche one his valour, & dy

uyde

uyde by 4464, or by the halfe that is 2232 and then ye shall wryte howe muche ech one ought to paye. Example.

The fyrst shoulde paye 5 francz 9 shyllynges 3 d. and halfe rest. 1464

The seconde sholde paye 12 francz 17 shyllinges 3 pens, resteth 1392.

The thyrde shulde paye 8 frances 8 sh. 4 pens resteth 660.

The fourth shuld paye 54 frances 15 shyllynges 2 pens, resteth 1248.

The fyfte shulde paye 62 frances 17 sh. 2 pens resteth 96

The sixt shulde paye 2 frances 3 sh. and halfe 2 pence and halfe, resteth 1032

The seuenth shulde pay 24 frances 1 shillinge 0 pens, resteth 192.

The eight should pay 4 frances 7 shilli, 5 pens resteth 2064.

The ninth shulde paie 23 frances 15 shil. 10 pens and halfe, resteth 2088

The tenth shoulde paie 27 frances 6 sh. 7 pens resteth 624

¶ And they haue to diuide 2 pens and halfe of restes. Then whan ye haue all diuided

diuided and wryte the somme and the
restes, ye shall set togither all the restes,
and diuide them by the deuysor comune,
or by the halfe. And yf there be more or
lesse, the rule is not well made, for the re-
maynaunt of al ought to be deuyded by
the diuisor comun. And the proue of this
rule is reduction. And marke well this
rule for it is ryghte good vnto the coun-
tre where all the goodes be praysed by al
the townes and castels, as it is in manye
places of Daulphyne, and of Prouence.

¶ The rule of thre mylnes.

¶ One man hath thre mylnes of whome
one grindeth eche day 5 septiers of corne
and the other grynd eth 7 and the thyrd
8. There commeth a marchaunt that wil
haue grounden one hundreth septiers
of corne, I demaund how ought ỹ milner
to diuide the corne to the mylnes to the
ende that eche one haue assone done as
an other. Answer. For to know this que-
stion and rule. ye must fynde the diuysor
and the multiplicatour, the multyp. shall
be eche one by hym selfe, and the deuysor

shalbe

shalbe the thre multiplicatours set togy-
ther ỹ ben 20. Therfore yf ye wyll know
how much corne ought to be layde vpon
the fyrst myne, ye must multiply the 100
septiers of corne by 5 & deuide by 20, whi-
che shal be 25 septiers, that shalbe layde
vpon the fyrst milne. And for the seconde
ye shall multiplye 100 by 7 and diuyde by
20, and there shall be 35 septiers, the whi-
che ye shall putte vpon the seconde myl-
ne, and for the thyrde ye shall multyplye
100 by 8 and dyuyde by 20 and there shal
be 40 septiers, whych ye shall put vppon
the thyrd myne. And thus may ye do of
all other semblable. It maye be made o-
therwyse, set togither the sommes that ỹ
thre mylnes grynd that is 20, and by the
rule of thre ye shal saye, yf 20 gyue me an
100, how much shall geue me 5 or 7 or 8.
And it is proued by addition. Example.

100

The fyrst shall haue 25 septiers. The se-
cond 35 septiers. The thyrde 40 septiers

7,5,8, 20

Multiplicatours. Dyuysour.

The

The rule and questyon of a shepe herde or pastour.

Foure men haue 300 shepe or moutons, of whome the fyrst hath an 100 shepe, the seconde 40, the thyrde 150 and the fourthe 10. And they gyue vnto a shepherde for to kepe these shepe 25 fr. for a yere. I demaund how ought the one to paye of the 25 fran. after the shepe that he hath. And how long time ought eche one to haue hym at comense or meat. Answer For to knowe this rule and all other semblable, it behoueth you to fynde ỹ multyplycator and the deuysor, the multyplicator of the fyrste shall be 100, of the seconde 40, of the thyrd 150, and of the fourth 10, & then set toge ther all these sõmes ỹ which bene 300 the diuisour commune. Or ye may make it by the rule of thre in saying. yf 300 gyue me 25, how much shal giue me 100 or 40 150 or 10, & alwaies diuide by 300 and thus of all other rules.

Ensample of the fyrste.

100	8 francs.	6 ſz	2 pens
40	3 franc.	6 ſz	8 pens.
150	12 franc.	10 ſz	
10	0 franc.	16 ſz	8 pens 300.

Multiplycatoꝛs. Dyuyloꝛ:

¶ Now foꝛ to knowe how longe eche one ought to nouriſhe hym, ye muſt make the yere in monethes, and than multyply by the multyplicatoꝛs, as is layd aboue, and dyuyde by 300. Oꝛ to make it moꝛe ſure and certayne, ye ſhal ſet the yere in dayes that ben 365 and then multyplye eche one by his multyplycatoꝛ, and dyuyde by the dyuyloꝛ cõmune, that is to wyt by 300, & ye ſhall fynde that the fyꝛſt ought to nouryſhe the ſheperde 121 dayes and a halfe, and a fyxte parte. The ſeconde 48 dayes and a halfe and a fyxt parte. The thyꝛde 182 dayes and an halfe. And the fourth 12 dayes and the fyxte part of a daye. And thus maye ye do of all other rules.

¶ The rule and queſtion of a veſſell with thꝛe fountaynes oꝛ holes.

A Uessel holdeth 60 Septiers of wine in the which there be thre foũtaynes or holes, of whom yf the leste renne it shulde empty 1 septier in an houre, and the nexte 2 septiers in an hour, the thyrd 3 in an houre. It hapneth that it runneth at all the thre fountaynes at ones, I demaunde in howe many houres the vessel shalbe voyde, & how muche eche one shall voyde by it selfe. Answere. For to knowe howe much eche one shall voyde. It behoueth you to fynde the multiplycatours, therfore deuide 30 by 1, and it is 30 which is the multiplicatour of the fyrst. For the seconde diuide by 2 and therof cometh 15 And for thyrde diuide by 3 and that is 6. And than set togither all the summes, that is to wyt, 30, 15, & 6, & they be 51. therfore multyplie eche one by hym selfe and deuyde by 51, Example

30	35 septiers 1 quarte and an halfe.	
15	17 septyers 0 quarte and an halfe rest 4 and halfe.	
6	7 septiers 0 quart, rest 12	51
Multiplicatours		Diuisor

And for to know in howe manye houres this vessell shall voyde, ye shall set togyther the thre numbers, that is to wit 1, 2, 5 which ben 8 and that 8 is the deuisor therfore diuide 60 by 8, and ye shall fynd that in 7 houres and an halfe it shall be empty And thus may ye do of all other semblable.

¶ The rule and question of saralins for to cast them into the sea.

There is a Gallye vpon ỹ sea wherein be thyrty marchaũtes, that is to wit, 15 chrisien men, and 15 saralyns, there falleth great tempeste wherevpon it behoueth them to cast all the marchaundise into the sea, and yet for all that they be not in surety for perysshynge, for the Gallye is feble and weke, so that by ordynaunce made by the patrone, it is necessarye that there be caste into the sea the halfe of the thyrty marchaũtes, but the saralyns wil not be cast in, nor also the chrisiians, then by an appoyntment made, they shall sette them downe vpon a rowe, & then counte them vnto 9 and he that should fall vpon the 9 to be caste into the see, how wold ye

set

set them that none of the chrystians shuld be cast into the sea. Answere. ye shall ordeyne them after these meters folowing

Post.iiii.quinquæ da post duos unum colloca
Tres numerabis, postea unum collocabis
Vnum dic panther, et duo consequenter.
Duos post ponas et.iii. simul hic apponas.
Semel dic ante bis. post ii. unum terminabis.
Primi christiani, sunt Saraceniquæ secundi.

That is to wytte 4 chrystiens 5 sarazins 2 chrystians 1 sarazyn, 3 chrystians 1 sarazin 1 chrystian 2 saraSins, 2 chrystians 3 saraSyns, 1 chrystian 2 saraSyns, 2 chrystians 1 saraSyn. Or for to know it more shortelye ye may worke by this verse folowynge, by the number of the vowels.

Populeam uirgam matrem regina tenebat.

¶ The rule and question of a Testament.

A Man hath made his testament, the which hath left his wyfe greate, and hath ordeyned in his testament that yf she brought forth alone, he should haue two partes of his goodes, that is to wit, of 1200 crones, and his wife ỹ other part,

and yf she brought forth a doughter, then the moder shuld haue two parts, and the doughter the other parte. It happeneth whan the man is dede, the wyfe bringeth forth a sone and a doughter. I demaund how shal they diuide the 1200 crones. Answere, ye shal set 1 for the doughter, and 2 for the mother, for ỹ mother ought to haue two partes against the doughter, and set 4 for the son for he ought to haue two partes agaynst the mother. Therfore ye shal multiply the 1200 crones by 4 for the sone, by 2 for the mother, and by 1 for the doughter. And for to finde the diuisor ye shall set togither 1, 2, and 4, whiche ben 7, therfore diuide by 7. Example.

4 The sonne shal haue 685 crones & an halfe, 7 ſ. 8 d. & halfe, resteth a halfe d.

2 The mother shall haue 342 crones, & an halfe 12 shyllinges and halfe. 4 d. Resteth 2 pens.

1 The doughter shall haue 173 crones. 15 ſ. 5 pens Resteth 1 d.

7

Multiplicators Diuisor.

They haue to diuide an halfe peny.

The

¶ The rule and question for to buylde.
And fynde for the place.

A Man hath a grou̅d that is in lengthe
100 yardes, and in brethe 70 yardes,
where as he wyll edyfye and buylde
houses, of lengthe 5 yardes, and 4 brethe
I demaunde how many houses shall he
haue vpon that ground. Answer. ye shall
multyply the lenghte by the breth in say-
enge 70 tymes 100 ben 7000, and eche
house must haue 5 yardes of length, & 4
of brede, multyplye that one by ỹ other, &
they make 20, which 20 shal be the dryu-
sor cõmune, therfore deuide 7000 by 20 &
ye shall fynde that there shall be 350 hou-
ses Note well this rule.

¶ The rule and questyon of the walles.

A Manne wyll make a wall 32 fote in
lenghte, and 2 of thyckness, and the
heyght 25 fote, and eche fote shal cost
the makyng 2 s. I demaunde how moch
shal cost the maknge of all the wall
Answere. For to know this rule, ye shall
multyply the lengthe by the thyckenes in

sayinge 2 tymes 32 ben 64, & then ye shall multyplye it by heyghte in sayinge 25 tymes 64 ben 1600, and then multyply by ỹ pryce, that is to wytte by 2 shillynges the which ben 3200 shillinges, wherof ye shall make francz, therfore diuide them by 20 and they ben 160 francz. And so much shal coste the making of the wall.

¶ The rule and questyon of the couerynge.

¶ If ye will haue a houle couered wyth tyelles, ye must knowe how many tyelles behoueth you to haue vnto the length of a tygne, and how many to the bredde.

Example. If the house had nede of 54 for the length. and 34 for the brethe, I demaunde howe manye should be requisite vnto all the houle. Answere. Multyplye the length by the brethe in saying 34 tymes 54 ben 1836 tielles, and so many must ye haue to couer the houle.

The rule & questyon of a garden.

¶ A louer dyd entre into a garden for to ga-

gather apples for hys lady, and vnto the
sayd gardyn ben thre gates, and in eche
gate is a porter, and when he shall yssue
after that he hath gathered the apples, he
must gyue the halfe of his apples & one,
to the fyrste porter, and when he is at the
second porter, he must giue vnto hym the
halfe and one, and to the thyrde porter ye
halfe and one, & when he is forth he hath
no more but one apple to gyue vnto hys
lady paramour. I demaund how many
apples had he gathered. Answere.
He had one, aple when he was forthe, set
to it one, and then it is 2, and then double
the 2 and it is 4, therfore he had 4 at the
thyrde porter. Then to this 4 set 1 & that
is 5, and then double them and that is 10
therfore he hath 10 apples at the seconde
porter, to this 10 set 1 & it is 11, double the,
and that be 22 apples. Therfore ye maye
say that he had gathered 22 apples.

¶ The rule and questyon of a ladder or stayre.

¶ I haue sene a stayre that had 100 step-

pes,

pes, in the fyrst steppe was 1 douke in the seconde step 2, in the thirde 3, in the fourth 4, and so vnto 100, I was demaũded how many doukes were in al the stayre. I answered 5050. Wherfore I will gyue you certayne of all nomber that do procede naturally, that is to wyt ,1,2,3,4,5,6,7,8,9,10, And infinitly as ye wyll, for all nouber naturall is ended in nomber euen or in nomber not euen, yf it be ended in nomber euen, than by the halfe therof multyply the nomber not euen, that encloseth it Example. 1,2,3,4, wyll ye know what all amounteth vnto in sayeng 2 tymes 5 ben 10, for 2 is the halfe of 4, and 5 is the nomber not euen that encloseth 4, And yf the nomber ende in nomber not euen. As by ensample, 1.2,3,4,5, wyll ye knowe what all amounteth vnto. Multyply 5 by his greater halfe, that is 3, sayenge 3 tyme 5 ben 15. And thus shall ye alwayes doo in what nomber so euer it be euen or not euen, &c.

¶ The rule and question of two men,

It

If two menne go by the waye, and that they go into any far place, and procede in suche wyse, that the one procede eche day certayne number of miles, that is to saye 4 and 6 moze oz lesse. And that other man goeth encreasynge the fyrste daye one myle, the second daye two, the thyrde thre, and so encreasynge after progressyon. Be ye al certaine that in some day the one ouertaketh thother. It is demaunded in what daye, and how many myles they shall go. Answer. Double the noumber of his myles that goeth eche day an egall number of miles And the number double take awaye one vnytie, and the remanant shall shew you what daye they shal meete eyther other.

Example.

We shall set it that the one goeth a daye 6 myles, double that and it is 12, and fro that 12 withdrawe one vnite, as it is sayd in the rule, and there remaineth 11, that is the number of the day that they shal mete togither. And foz to know the number of

the

the myles that they haue gone. Multy-
plye 11 by 6 in sayinge 6 tymes 11 ben 66
myles ỹ they haue gone. Thus ye maye
knowe it by the rule of progression con-
tynued, 11 is a number not euen, be it ther
fore multiplied by the greater halfe that
is to wytte by 6 in sayinge 11 tymes 6 or 6
tymes 11 ben 66. And also one onely num-
ber amount by progression, & by multy-
plycation, wherby it appereth that vpon
the elleuenth daye they mete eche other,
and haue gone 66 myles.

The rule and question of the women that bare appels to the market.

THre women bare apples well & ho-
nestlye trymmed to the market, of
whome the one bare 50, thother 30,
and the thyrde 10, theyr husbandes were
brethren & gaue cõmaundement to them
ỹ they shoulde make as good market one
as an other, that is, that they sell all after
one pryce, & that the one bryng as much
money home as the other. I demaunde
howe that may be done. Answere. It is
possi-

possible. For fyrste there commeth a marchaunte to hyr that hath 50 apples: and sayth to hyr how many for one peny, and she aunswered 7 and so she maketh 7 d. of hyr 50 apples and hath remaynynge one apple. The other solde after the same pryce. And she that had 30 apples solde hers for 4 d. and she had remaining 3 apples. The other that had 10 apples solde hirs for 4 d. and she hadde remayninge 2 apples. And thē came ther another marchaunt that gauez pens for an apple. And so eche one bare home 10 d. as ye se in this ensample. And thus may ye do of all other semblable.

¶ The rule and question of the bagge.

A Marchaunt hath a bagge that weyghеth 19 ounces of three mettalles, wherof 7 ounces ben of golde 8 of syluer and 4 of copre. And he wyll take thereoute 5 ounces . I demaunde howe moche of golde, how much of syluer, and how muche of copre is in these 5 ounces. Answere, ye shall multyplye the 5 for to kno-

knowe the golde by 7, for the syluer by 8 and for the coper by 4. And for to fynde the diuysor, ye shall set all the multiplicatours togither, that ben 19, therefore deuyde by 19. The answer is in this ensample 5 ounces.

7 Of golde 1 ounce an halfe 8 pens 5 grayne. Resteth 1 pens.

8 Of siluer 2 ounces, 2 pens and halfe, 1 halfe grayne. Resteth 2 pens.

4 Of coper 1 ounce 1 peny 6 graynes. Resteth 6.

¶ Now set the remnaunte togither and diuide it by the diuisor commune, that is 19. And it is 1 halfe grayne.

¶ The rule and question of the bell.

IN a church is made a bell, and therein is put 30 pounde of golde 50 li. of syluer, 100 of tynne, and 102 of coper whan the bell is made there remayneth 40 pounde in one piece, that they wyl sell I demaunde how much is there of golde how much of syluer, how much of tynne, and

and how moche of copre. Answere.
ye shall do as aboue is sayd of the bagge
for ye shall multiply 40 eche one by hym
selfe, and dyuyde by 282.

¶ Example.

30 Of golde 4 pounde 4 ounces 4 pens
1 grayne. Resteth 6

50 Of syluer 7 pounde 1 ounce 11 pens,
9 graynes and an halfe. Resteth 17

100 Of tynne 14 pounde 2 ounces & halfe
10 pen, and halfe 7 graynes.
Rest 114 pens.

102 Of copre 14 pounde 7 ounces 11 pens
and an halfe 5 graynes and halfe.
Resteth 105.

Multyplycatoꝛs, 282 Dyuyloꝛ cõmune
And all dyuyded they haue of reste 1
grayne.

¶ This rule is proued by reduction, set
to the same that remayneth, and dyuyde
by the dyuyloꝛ cõmune, & therof cometh
1 grayne.

The

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Resteth 105.

Multyplycatorys, 282 Dyuysor cõmune
And all dyuyded they haue of restes 1
grayne.

¶ This rule is proued by reduction, set
to the same that remayneth, and dyuyde
by the dyuysor cõmune, & therof cometh
1 grayne.

The

¶ The rule and questyon to chaunge golde into syluer.

A Marchaunt hath 100 francz in golde and he goth vnto a chaũger & sayth, I haue 100 francz in pyeces of golde I would haue the money therof in small pyces, that is to witte, of 2 pens, of 3 pens of 4 pens, of 5 pens, of 6 pens, of 8 pens, & of 10 pens, & I wold haue as many pyecz of one as of another. I demaunde howe many pyeces of euery money ought the chaunger to gyue him. Answere, ye must set together all these numbers 2, 3, 4, 5, 6, 8, and 10, that bene 32 the deuisor cõmune and then ye must make of the francz pens that is 2400 pens, which ye shal deuide by 32 and there ben 750 pyeces of eche money, and thus ye may do of all other semblable.

¶ The rule and question of cloth of dyuers colours.

I Haue a pyece of clothe wherof the thyrd part is whyte, the fourth part blacke, and 8 elles of graye. I demaunde howe muche hath it of lengthe.

An-

Aunswer. Set 12 for in 12 ye shal fynde one thyrde and one fourth, the thirde and the fourth of 12 is 7, and there remayneth 5, therfore from the rule of thre, yf 5. be comen of 12, of how moche shall come 38 multyply 12 by 8 that it 96, & dyuyde by 5, and therof cometh 19 elles and 2 fifte, therfore ye may answere that the pyece of clothe hath of lenght 19 elles and one fyfte.

¶ The rule and questyon. of spycerye.

¶ A bouegesse sayd vnto his seruaunte holde these 12 frances, and go and by the peper that costeth 15 sz. the pounde, and sugre that costeth 18 sz. the pounde & of fine spyces that costeth 9 sz. the pounde, and gynger that costeth 13 sz. the pounde, and clous that costeth 10 sz. the pounde, and bryng me as many poũdes of one as of another. I demaunde how many poũdes ought the apotycarye to gyue him for 12 francz. Answere. ye shal set al ỹ prices to gyther 15, 18, 9, 13 and 10, that ben 65 which shall be the dyuysor, & then ye shall make

the frauncz in shyllynges, that is 260 shyllynges. And than ye shall deuyde by 65, & therof cometh 4 pound, therfore ye maye answer, that he ought to yeue hym 4 pou des of all these spycerye.

¶ The rule and question of the egges.

A yonge man bayeth egges to the market for to sell and hyreth a yonge man that wold play with hyr so much that she ouerthrowe breketh the egges euery one, & will not paye for them. The mayde doeth hym to be called afore the iudge. The iudge condempneth hym to paye for ye egges, but the iudge knoweth not howe many egges there were All that she demaundeth of the mayde, she answereth that she is but yonge, and can not well compte, but she and hyr moder had ordened and disposed them by 2 and 2 & there remayned 1 egge. Than by 3 and 3 & there remayned 1, than by 4 and 4 and there remayned 1, than by 5 & 5, & there remayned 1, than by 6 and 6 & there remayned 1, and at the last by 7 and 7 and there remayned.

none

none, I demaũde howe many egges there were. Answer. 721. And for to proue it, multyply the nõbers one by another in sayenge 2 tymes 3 ben 6, 4 tmes 6 ben 24, 5 tymes 24 ben 120, 6 tymes 120 ben 720, & set therto 1 that remayned alwayes and thã they ben 721 that which ye shal deuid by 7, and there remayneth nothyng, and so she hadde 721 egges. And after this ensample myaye iudge the yongeman to pay.

¶ The rule and question of money forgotten with a chaungeour.

A Mã aduocate hath gyuen to a chaungeour money, & hath forgotten howe moch. For to know howe moche and for to haue all his money, he he fyndeth subtyltye that ensueth, saieth to one of his sonnes, of whom he hath many go vn to suche a chaũgeour & bryng me a frãce and the tenth part of the money that I deliuered hym, and so was it done. And an other tyme he sayd vnto another sõne, go vnto the chaũgeour & bryng me 2 frãces and the tenth part of the remaynant, and so he sayd vnto all, but vnto ỹ last he sayd

vnto the chaunge our, and bryng me all the remaynant of the money, and so was it done, and as moche brought ỹ one as the other. I demaunde how moch mony he hadde, how many sonnes, & how moch money eche one of thē brought. Answer For this thre questions pose the nomber that they al brought, that is to wytte, the tenth ben 19, and of 10 take one and there do remayne 9, therfore ye may say that he had 9 sonnes, and eche one brought 9 fz. And for to knowe how moche he had gyuen to the chaungeour, ye must multiply 9 by hym selfe, and it is 81. Therfore he had delyuered 81 frances to the chaunge our For to make the prcue lay 81 and take vp for the fyrst sone 1 and the tenth parte of the remaynant, and in lyke maner ye must do of al other.

¶ The rule and question, of tyme. &c.

¶ A mā sayth yt I hadde as moch more of tyme as I haue, and ỹ halfe, the thyrd and the fourth of my time that I haue let to. I shold haue of yeres 50, I demaund what

what age he hath. Answere. Lays 12, for 12 ye fynde an halfe, a thyrd, and a fourth. And thē set there ones as moch, & that ben 24, than set therto 1 halfe, 1 thyrde, & 2 fourth of 12, and they ben 37, and thenne fourme thy question. yf 37 be comen of 12 of howe moch shall come 50. Multiply 12 by 50 and dyuyde by 37, and ye shal fynde that he hath 26 yeres 78 dayes & a halfe 10 houres resteth 2.

¶ The rule and question for to de uyde dystrybucyons.

In a churche ben 12 chanōs 9 prestes and 6 clerkes they haue to dyuyde a dystrybucyon of 400 frāces, werof the chanons haue 3, the prestes 2 and the clerkes 1, Idemaunde howe mouche shall haue the chanons, how moche the prestes and howe moche the clerkes. Answere. Multyplye one nomber by an other in sa yenge 3 tymes 12 be nz6 that is the mul typpicatiour for the chanons, 2 tymes 6 ben 28, the multyplycatour for ỳ prestes, 1 tyme 6 ben 9, the mnltyplycatour for the clerkes. Howe moche eche one oughte

to haue ye may se in the enſample by the deuyſor. Set togyder al the multyplycatours & they ben 60, the deuyſor comune,

36	24°	franceſ
18	120	franceſ
6	40	franceſ

Multiplycatours Deuyſor 6⁹

¶ The rule and queſtion of the ſpeyre.

A Speyr is the halfe and the thyrde part within ỹ water, and 9 fote with oute. I demaunde howe myche of lenghte hath the ſpere. Anſwere. Set 6, for in 6 is founde a halfe and a thyrde the halfe and the thyrde of 6 ben 5, and there temaneth 1, forme the rule of thre: yf 1 be comen of 6 of howe many ſhall come 9 multiply 6, by 9 and they ben 54, deuid thē by 1 and they ben 54, therfore ye may anſwere that ỹ ſpere hath 54 fote of lēgth the halfe is 27, & the thyrd is 18, and there bē 45 fote within the water, & 9 with out that is 54. And ſo maye ye do of all other ſemblable, as of a toure.

The

✠ The rule and question of two mē that went that one agaynst that other.

Two men begin to go and take theyr iourney that one agaynst that other vpō one daye and in one houre. For that one that goeth fro Parys to Londō and goeth euery daye 7 myles, that other goeth frome Lyon to Parys, and goethe eche daye 9 myles, and from Lyon vnto Parys ben 80 myles. I demaunde howe lōge tyme shall it be or they mete. Answer Set togyder the myles that they go in one daye, ꝑ is to wyt, 7 and 9 ben 16, forme now the rule of 16 come of 1 daye, of howe moche shal come 80 that they haue to go, multyple 80 by 1 & it is 80. the whiche he may deuyde by 16 & therof cometh 5, therfore in 5 days they mete. The proue is for he ꝑ from Parys to Lyō goeth in 5 dayes goeth 35 myles, & that other 45 the which ben 80 myles.

¶ The rule and questyon of a catte.

There is a catte at the fote of a tre the lēght of 30 fote, this catte goeth vp

warde

warde eche daye 17 fote, and descendeth the nyght 12 fote. I demaunde in howe lõge tyme shall she be at ỹ toppe, Answer. Take vp and abate the nyght of the day, that is 12 of 17 and ther remayneth 5, ther fore the catte mounteth eche daye 5 fote, deuyde now 300 by 5 & therof cometh 60 dayes then she shall be at the toppe. And thus ye maye do of all other semblable. For of this rule ye may make 4 questyons, as it appereth in the practyse therof

¶ The rule and questyon of 20 scolers.

If 20 scolers owe vnto theyr host 5 d tourneies, how oughte they to pay, so that eche one pay his duty & giue the money of his purse. How moche shall eche one paye. Answere. Eche one shall pay 1 peny Parys, and the hoste shall return vnto hym agayne 1 peny tournoys and so eche one shall paye the 4 parte of a tournoys.

¶ The rule and question of pylgrymes.

¶ Twenty pylgrymes, that is to wytte, men

men, women, and lyttell chylderne, haue spended drynke 20 pens, wherofthe mē paye 3, pens, the women 2 pens, and the li tell chyldren halfe pens. I demaūde how many men, & how many womē, and how many chyldren be there, for to pay this 20 pens, so ẏ there be 20 persons. Answer. There shall be one man. 5 women, and 14 chyldren.

¶ The rule & questō of a chauntour.

¶ A chauntour hathe eche daye of rente fro the courte of the prynce 12 sȝ. ẏ which is payed by knyghtes, damoyselles, and squyres of whome ẏ knyghtes paye 2 sȝ the damoysels 6 pens, and the squyers 3 pens. I demaunde how many knyghtes how many damoysels, & howmany esquy tes ought there to be, to paye this 12 sȝ. so ẏ there be 12 persones. Answere. There must be 5 knyghtes, 1 damoysell, and 6 esquyres.

¶ The rule and questyon for to dyuyne,

¶ If ye wyll cause your felowe to by leue that ye shall dyuyne howe many pye

ces of syluer he hath in his ryght hande say vnto him that he put as many pyeces in that one hãde as in that other And thã that he take syue from ỹ lyft hande to the ryghte hande and than that he put forth of the ryght hande into the lyfe hand as many pieces as he hath remayning in the lyfte hand: And there shall remayne 10 in the ryght hande.

¶ The rule and questyon of thre saynctes.

A Holy hermite is ẽtred within a chur che wherin there ben thre saynres: ỹ is to wyt, saynt Peter, saynt Paule, & saint Francoys, this heremite cometh fyrst to saynt Peter and sayth to him in a maner of his orayſõ, I pray ỹ that it pleal the to double me the great blances ỹ I haue in my purſe, and I shall gyue the 6, and so was it done. Thã came he to saynt Paule & sayde to hym pleaſe it the to dou ble me ỹ great blantes that I haue in my purſe and I shall gyue the 8 and so was it done. Then came he to saynt Francoys & sayd, yf it wolde pleaſe to double me the great

greatblances that I haue in my purse I shal giue the the 6, and so was it done, and nothynge had he remaynyng. I demãd howe many greate blances had he in his purse. Answer. He had 5 & 1 fourth. And for to know it double them and they ben 10 and an halfe, and then ye must gyue 6 to saynt Peter, and there remayneth 4 & an halfe, double them & they ben 9 And then gyueth he 6 to saynt Paule, & then there remayneth 2 double thẽ and there ben 6 and that 6 gyueth he to saynt Francoys, and so he hath nothynge remaynge.

Here folowe dyuers other proper rules and questyons.

A Lord hyreth a seruaunt the whiche he sholde gyue euery yere 10 nobles and a gowne and the same seruaunt dwelleth 7 monethes wyth hym, and then they varye in so moche that his lord gaue hym lycence to go his way. And sayth, go thy wayes out of my house and take thy gowne with the, and then I am nothyng in thy dette. Now I demaund what was the gowne worth, wyll ye know that, thẽ

marke

marke how many monethes 7 is lesse thā
yere, that is 5 moēthes lesse. And had ꝯ
seruaūt taried so long yet by this maister
than shold he haue had the gowne & 10 no
bles. Therfore saye thus 5 monethes gy-
neth 10 nobles, what giueth 7. Make it af
ter ꝯ rule of thre, & it cometh 14 nobles.

¶ Of thre felowes or yonge men.

¶ Thre felowes play togyther ꝯ one to
wynne the others money. For ꝯ one had
more money than the other. And the first
casteth, ꝯ the one of them three leseth iust so
mych money as ꝯ other two hadde, Thā
casteth the second and leseth also as mich
as the other two hadde Thē casteth the
thyrde and leseth also iust as mych as the
other two had. And than was the monei
iust deuyded, & had eche lyke moch. Now
I demaunde how moche had eche or thei
began to playe, & how mouch money that
eche had whan they played. Wil ye know
that, then marke how many persons dide
playe, & adde 1 to them, as here adde 1 to
3 maketh 4. So many nobles had ꝯ first.
Now double 4 cometh 8, & subtra 1 frō 8

rest

reſt 7: ſo many nobles had ȳ ſeconde. The double 7 cometh 14, therof ſubtra 3 reſt 13 ſo many nobles had the thyrd.

An other queſtion.

A Man byeth 46 pounde of ſaffrō for 30 pounde, what ſhall coſt 63 poūdes of ſaffraon. wyll ye knowe that, then multyply the 30 poundes with ȳ 63 poundes of ſaffron, comet 1850. Now deuyde them with 46 cometh 41 poundes & $\frac{4}{46}$ parte of a pounde to paye for the 63 poundes of ſaffron. Now wyll ye knowe howe many ſhyllynges that $\frac{4}{46}$ parte of a li. is. than multyply 4 by 20, for 20 ſ3 maketh a li. cometh 8 ſ3. deuyde thē with 46 cometh 1 ſ3, and $\frac{4}{46}$ part of a ſ3. Now wyll ye knowe how manye pens that $\frac{34}{64}$ parte of a ſhyllynge is, thē multiply 34 with 12 d. pens maketh a ſ3, cometh 408. Diuide them with 46 cometh 8 pens and $\frac{40}{46}$ part of a peny. Now wyl ye knowe how many farthynges that $\frac{40}{46}$ parte of a penye is then multiplye 40 with 4, for 4 farthyn-

ges

ges maketh a peny, comet 260 farthyn-
ges. Now deuyde the with 49, cometh 3
farthynges and 22/45 parte of a farthyng.

Thus done ye shal fynde that 63 li. of, sak
tron coste 41 li, 1 sh. 8 farthynges and 22/49
parte of a farthynge.

¶ Item a 165 poundes of alaine coste 2
poundes 5 shyllynges 6 pens 9 farthyn-
ges: what shal cost 22 poundes of alone.
If ye wyll soyle this question, than make
of your pouudes shyllynges & adde ther-
to the odde 5 shyllynges: commeth 45 sh.
Then make of the 45 sh. penes, and adde
6 pens, commeth 546 pens, than make
of your pens farthynges, and adde ther-
to the 9 odde farthynges, cometh 2193 far
thynges. Now multyply the farthynges
with 22 coeth 48246 farthings. Now de
uyde them with 165 cometh 592 & 66/165 part
of a farthynge, for so many farthynges
shall coste 22 li. of alone. Nowe wyll ye
knowe how many pens that the forewry
ten farthynges make, then dyuyde them
with

with 4, for 4 farthynges make a peny. Then wyll ye knowe how many shyllynges that they make, then deuide the pens w̄ 12, for 1 pens maketh a s. Thus done ye shall fynde that 22 pound of alome cost 6 s 1 d. 3 farthyng, and it is done.

Another questyon.

A marchaunt hath bought a bagge of peper, I saye not how heuy, but whan he gyueth for a pound of peper 12 pens, then remayneth hym yet 37 d. And when that he gyueth for a pounde of peper 15 pens, then he lacketh 44 pens to pay for the peper. Now I demaūd how heuy ỹ bagge of peper was, and how moch money that the marchaunt had. For to know this & suche other lyke questyon, ye shall take and subtract 12 from 25 and there resteth 3, which 3 shalbe your deuyl or. Then shall ye adde 44 and 37 togyther, and that maketh 81. Thē muste ye deuyde 81 with 3, & therof cometh 27, so many pounde waieth the bagge of peper. Now wyll ye knowe how moche money the marchaunt hadde then

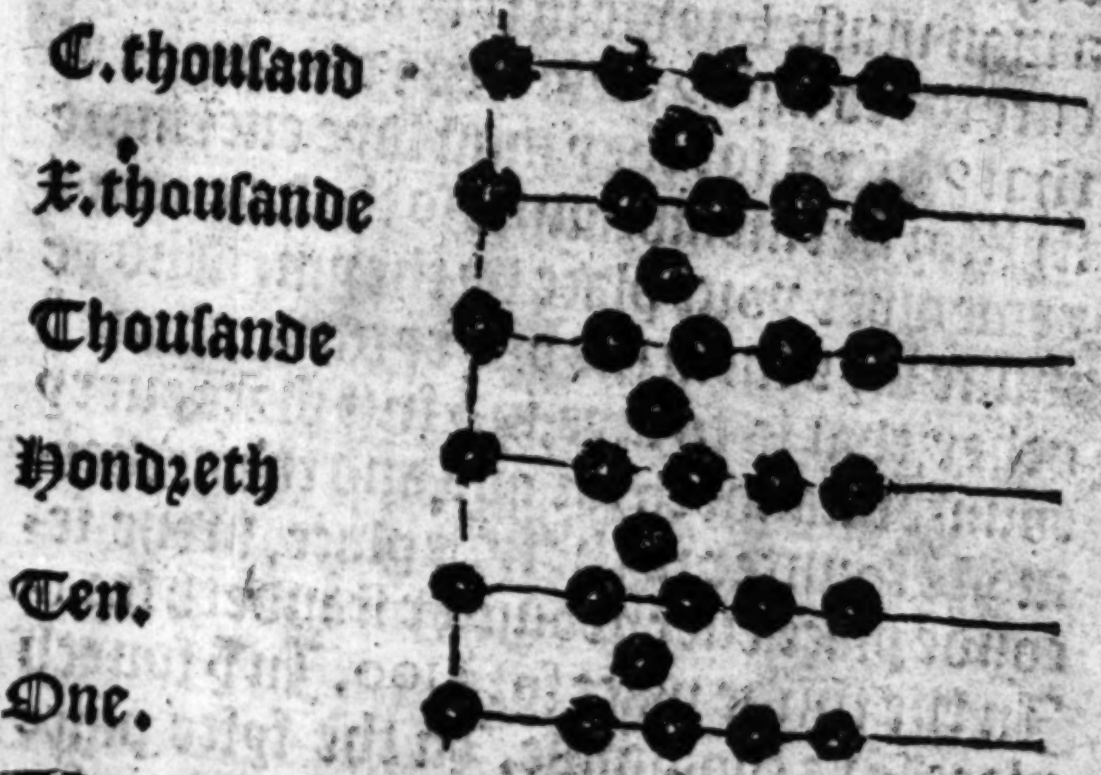
then must ye multiplye 12 with 27. and adde 37 therto, or multyply 15 with 27 & subtra 44, cometh 361, so manypēs hadde the marchaunt.

An other questyon.

A Dronkart drynketh a barell of bere in the space of 14 days, and whē his wyfe drinketh w̄ him than they drincke it out within 10 daies. Now I demaū de in what space that his wyfe shold drincke that barell of bere alone, For to soyle this questyon & suche other lyke, ye shall fyrst subtra the leest drinker from ỹ more that is 1° from 14 and ther remaineth 4, & that is your deuisor. Now saye 4 giueth 10 what giueth 14 Make it after the golden rule, and ye shall fynde that she shold drynke it in 35 dayes.

Here endeth the introduction of awgrym for the pen.

Here beginneth the introduction for to learne to reken with the counters with diuers rules belongynge to the same.



FOr as much as there ben many persones that ben vnlerned, and can not wryte, yet neuertheleſſe the crafte or ſcience of awgrim and rekeninge is nedefull for them to know, wherfor I ſhal hereafter declare & writ of this ſcience in the beſt & ſhortest wise that maye be poſſible, how that ye ſhal order your ſelfe in

rekenynge and to caste counter.

¶ Fyrste ye shall vnderstand that in the craste of awgrym be 9 letters or fygures that men may laye and wryte all maner of sommes withall. Therefore fyrst of all a man muste knowe in this craste or scyence for to laye 9 counters i the places of that 9 sifers, for they must laye euermore styll for a remembraunce so that ye maye remember your place by theym. And ye muste laye them the one ryghte aboue ỹ other, that is to saye, in ỹ fyrst place euery counter standeth for one, and the nethermoste counter is the fyrst place, in the seconde place euery counter standeth for 10 In the thyrde place for a 100. In ỹ fourth place for a thousande. In the fyfte place for 10 thausande. In the syxte place for 100 thousande. In the seuenth place for a myllyon. In the eyghte place for 10 myllyons. In the nynth place for a hondreth myllyons. In the tenth place for a thousande myllyons, and so forth infinitely. And note well that euery counter that is layde betwen the lygnes, betokeneth euermore

uermoze 5 times moze thenē the counter
that lyeth in the place nexte vnder him,
that is to saye the fyrste counter lyenge a
lone aboue the fyrste place betokeneth 5
the counter lyenge alone betwene the se-
conde and the thyrd lyer and place, stan-
deth foze 50 aboue the thirde place 5 hon-
derth, aboue the fourth 5 thousand aboue
the fyfte place 50 thousande, aboue the
fyxt place 500 thousand, aboue the seuēth
5 myllyons, aboue the eyght 50 myllyons
aboue the 9 place 500 myllyons, aboue ȳ
tenth place fyue thousand myllions. But
yf ye wyll the moze suere know your pla
ces it is necessary foz you to make euery
place with a marke, as to lay a counter oz
some other thyng which shal euer lay styl
and in no wyse be remeued, but ye muste
take hede yf ye laye coūters foz the marks
of your places, that ye laye them not to
nigh the counter that ye must worke with
all, lest that ye take the one foz the other,
but lay them as ye se them marked in the
ensamples folowyng, And when ye haue
layd markes and know the ozder of your

places, ye may adde, and subtra, multy-ply and deuyde what nombers ye lyst, that is to say, to cast and to abate at your pleasure.

¶ Item whan theere lye 2 counters be twene two lyers, take hym vp and laye 1 beslyde the nexte lyer aboue them. And when there ly 5 counters beslyde any lyer take them vp and laye 1 in the next space aboue them.

¶ Of addycyon.

Addycyon is none other thyng but te set togyther 2 or 3 nombers and to make of them a to tall somme, as in the ensample folowynge.

¶ There is a man whyche owyth 20 li. 18 pounde, 100 pounde, 50 pounde, and 69 pounde. Now yf ye wyll knowe howe much all these sommes maketh togither The for the first somme ye must lay two countres beslyd the seconnde lyer, for the two stande for 20, that is for the fyrste somme. Now for the seconde somme laye 1 counter beslyde the seconde lyer, for that

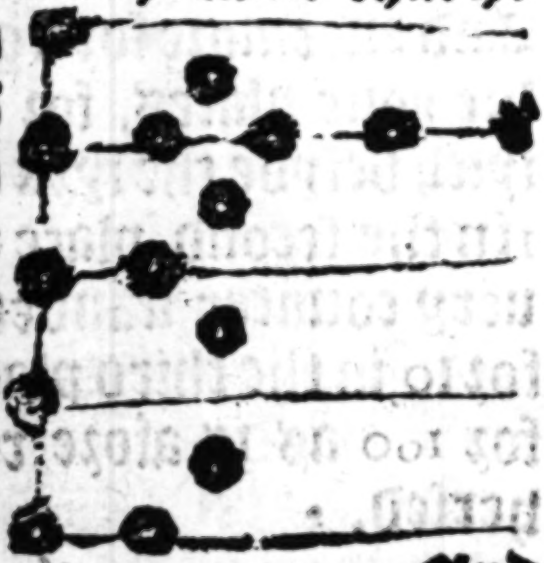
is

is 10, and lay 1 counter betwyxte the nethermoſt & the ſecond lyer, for that ſtandeth for 5, and then laye 3 counters beſide the nethermooſt lyer, and they all together make 18. Now for the thyrd ſumme ye ſhall laye 1 counter beſyde the thyrde lyer, for that is an 100. For the fourthe ſumme laye 1 counter beſyde the thyrde and the ſeconde lyer, that is 50. Now for the fyfte ſommelaye 1 counter betwyxte the thyrde and the ſeconde, and 1 beſyde the ſeconde lyer, and 1 betwene ỹ ſeconde and the nethermoſt, and 4 beſide the nethermoſt lier, and that maketh togyther 69, and in ſo doynge ye ſhall fynde that all the forewrittē ſummes make togither 247 as ye ſhall ſe in the figure folowing. And euermore for a generall rule remembre your places, for euery counter that lyith beſyde the fyrſt lyer ſtādeth but for 1 in the ſecond place euery counter ſtandeth for 10, in the third place for 100 as is afore reherſed.

Cwyll ye proue whither ye haue added well or not, than subtra all your summes one after an other. And in lykewise as ye do with this ensample so ye shall do with all other of addition.

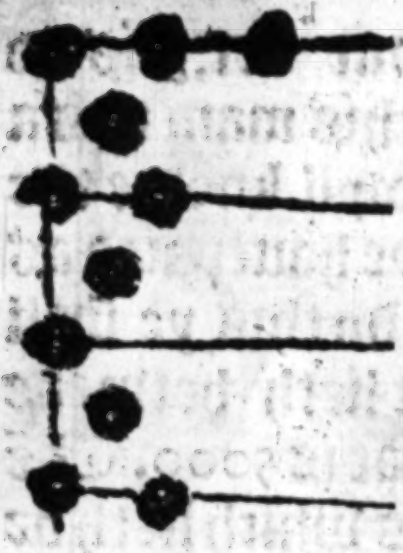
¶ Of subtraction.

Subtractiõ is, if ye wyll withdraw any summe from an other summe, ye must know two numbers, that is to wytte, the number that ye wil withdrawe, and the number where fro ye wil withdrawe. An ensãple. There is a man that oweth you 9756 poundes, and there vpon he hath payed you 5989 poundes, Now yf ye wil know what there resteth then set downe your sũme that he ought you, & therof withdraw the sũme that he hath payed you, and that ỹ remaineth is the sũ that he doth yet owe you, as ye more playnly maye see it in the ensamples hereafter folowynge.



And

And when ye haue set your det, ꝑ is to say 9756 pounds vnder this maner as a foze shewed. Then yf ye wyll knowe the rest, thẽ take therof that ye haue paied as 5989 poũdes. Now foz to do this, ye shall fyrst take vp ꝑ coũter that lieth betwene ꝑ fourth & fyft lyer foz that is 5000. Thẽ take vp one of the coũters which lieth beside the fourth lyer, & that is a thousand & ye shold take away but 900, therfoze ye must lay downe 1 coũter agayne beside ꝑ thyrde lyer, ꝑ is a hõdreth. Thẽ take vp one of the counters that lyeth beside the thyrde lyer, whiche is a hondreth, and ye sholde take vp but 80, therfoze ye muste laye 2 counters beside the seconde lyer, that is 20 and 80, that ye haue take vp maketh 100/ then take vp one of the counters that lyeth beside the seconde lyer, ꝑ is 10, and ye sholde haue take awaye but 9, therfoze ye must laye one counter beside the nethermost lyer, that is 1 and the 9 that ye haue subtrahed oz take vp, maketh 10, and there remayneth 3767 pounde det, and stande thus.



Wyll ye proue whither ye haue subtrahed well or not, then adde thereto that ye haue payde, and yf the somme come then so great as it was afore, then is your subtraction true, els not.

Multiplication.

Multiplication is nothynge elles but to multyplie one number by another, as thus, to knowe what is 6 times 9 or 6 times 12 and suche lyke And in multiplication ye muste consyder two numbers, that is to wit, the number that ye will multiplye, and the number whereby ye wyll multiplie, and ye muste worke in multiplication after this maner. Fyrste ye shall laye downe the lesser number, whiche is 6, and this 6 is the nõber that shall be multyplyed, and the 9 is the number that ye shal multiply withal And ye shall laye the number that shal be multiplied, at the right syde of your liers & when ye worke your multiplication, ye

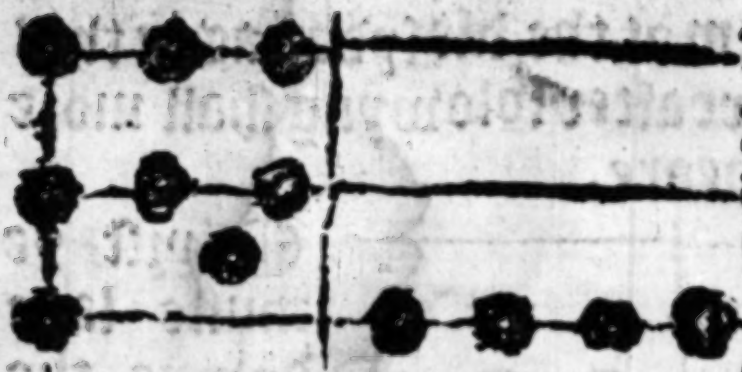
shall

shall laye them at the lift syde, as in this ensample hereafter folowyng shall moze playnely appeare.

¶ Fyrst ye muste laye downe the lesser nuuber, which is 4, as i this ensãple, as ye se them layde here on the right hande of the lyers. And when that ye haue thus done, ye must take vp one counter and laye 9 foz it on the other syde of the markes, that is to wytte, at the lyfte syde. And after that take vp another coũter, and laye also 9 foz it, and so foz the foz euery counter that ye take vp ye must laye 9 foz it at the other syde. And when that ye haue so wzought your wozke, it wyll come iuste to 36, as ye se the counters befoze layde on the lyft hande of the lygnes.

¶ And yf ye wyll multiplye by greater numbers as thus, to knowe what is 14 tymes 14. Fyrste laye 14 on the ryghte hand of your liers oz markers, as this ensample folowynge sheweth.

And



And then set your finger againste the second lyer, & that figer so set, doeth dãpne all ỹ places vnderneth as though that were the fyrste place, and than take vp the counter ỹ lieth in the place where your fynger is, and nowe reken that seconde place to be your fyrst place, & then lay 24 on the lyfte hande of youre marke as the enlample sheweth. After that don take away your finger and than take vp one of the 4 counters, and for hym laye 24, on the lyft syde, as ye dyd before, and so for euery counter that ye so take vp lai 24, and ye shall come to 336 as the ensample before sheweth, and then ye haue thef fecte of your question, that in 24 tymes 24 make iust 336. Forthermore yf there happen any counter to lay betwene ỹ places as 5 or 50, or 500 or such other, then ye must take hede how ye reken in the multyplyenge, as thus, yf ye woulde knowe

what

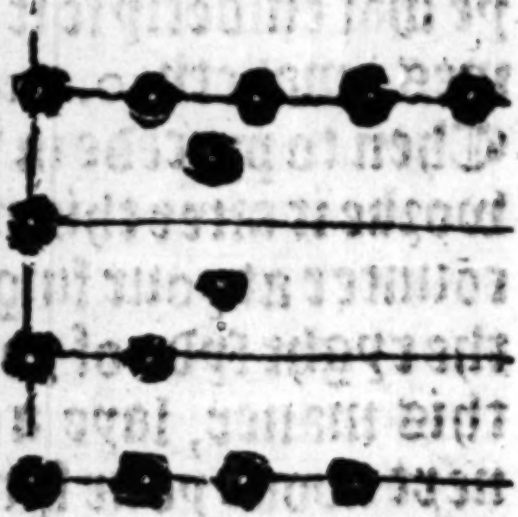
what is 8 times 16
fyrst laye 8 on the
right hãd of your
lyers as ye did be
foze, than set your
finger at ỹ coũter

that lieth alone aboue ỹ fyrste place whi-
che was layd foz 5, & then reken ỹ place to
be the first place, and then reken ỹ space
that is betwene the second place and the
thyrde place, to be your seconde place, so
that ye must reken him 10 from the place
where youre finger is, but this ye muste
specially take hede, that ye reken ỹ place
next aboue your fynger to double ỹ place
where your finger is, foz yf ye take hede
ye shal euidẽtly se it by reason, foz two ti-
mes 5 maketh 10. & 10 times 5 maketh 50.
Then to procede in your questiõ, ye must
worke it after this maner, take vppe the
counter at your finger, and lay foz it on
the ryght syde of your markers 16 after
this maner, laye a counter in the space
next aboue your fynger, and reken hym
foz 10, and thenne laye 3 counters in the
place

place next aboue your fynger, and reken euerychone of them for 2 whiche maketh iuste 6, then 10 and 6 maketh 16, as the fygure before shewed, when ye haue so done, then take awaye your fynger, and for euery one of the 3 counters that lieth in the fyrst place on the ryght syde lay 16 on the lyft side, and then take them of the right syde awaye and ye shall se that the number shall iuste come to 128, as the ensample before shewed. And this wyse ye must reken all counters that lyeth in the spaces yf the multyplication shalbe truely made.

¶ Another ensample.

¶ For to knowe how many grotes be in 4563 nobles. Fyrste ye shall set downe ỳ lesse number, that is the number that ye shall multiplye, as this fygure folowynge playnlye here sheweth.



Nowe

¶ Now for to make of these nobles grotes, ye muste multiplye them with 20, for 20 grotes maketh a noble. Now for to multiply this nomber, euermore ye must set downe the nomber that ye wyll multyplye at the ryght syde at your markes and set youre fynger agaynste the marke that ye begynne at, for your fynger shall be a remembrauuce to you for that place where youre fynger standeth is the fyrste place and damneth all the places vnder neth hym.

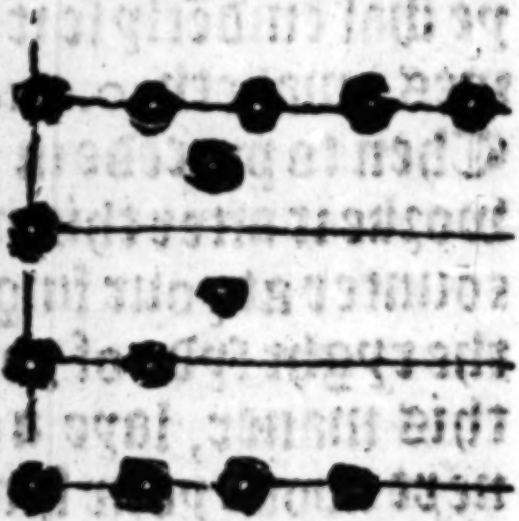
Now for to make grotes of these 4563 nobles. Fyrste ye shall set your fynger agaynst the fourth lyer, & take vp one of the foure counters that lyeth agaynste the sayd fourth lyer, & lay two counters beside the nexte lyer aboue that, where your fynger standeth, for that is the seconde place frome youre fynger, and the two counters so layde standeth for 20 ℔ is one noble, and lyke as ye haue done with this one counter, so shall ye do with the other 3 folowynge. Then take vp the counter that lyeth betwen the thyrd and

the

place next aboue your fynger, and reken euerychone of them for 2 whiche maketh iuste 6, then 10 and 6 maketh 16, as the fygure before shewed, when ye haue so done, then take awaye your fynger, and for euery one of the 3 counters that lieth in the fyrst place on the ryght syde lay 16 on the lyft side, and then take them of the right syde awaye and ye shall se that the number shall iuste come to 128, as the ensample before shewed. And this wyse ye must reken all counters that lyeth in the spaces yf the multyplication shalbe truely made.

¶ Another ensample.

¶ For to knowe how many grotes be in 4563 nobles. Fyrste ye shall set downe ỳ lesse number, that is the number that ye shall multiplye, as this fygure folowynge playnlye here sheweth.



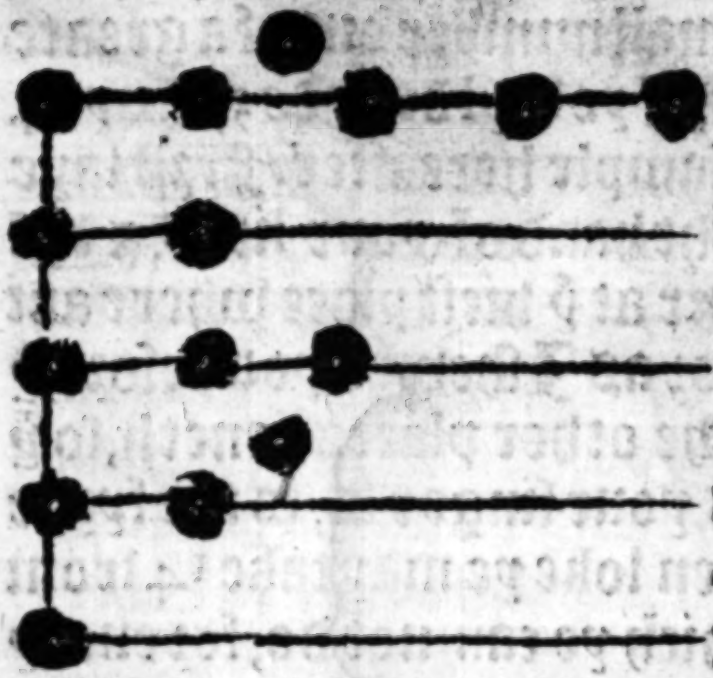
Nowe

¶ Now for to make of these nobles grotes, ye muste multiplye them with 20, for 20 grotes maketh a noble. Now for to multiply this nomber, euermore ye must set downe the nomber that ye wyll multyplye at the ryght syde at your markes and set youre fynger agaynste the marke that ye begynne at, for your fynger shall be a remembrauuce to you for that place where youre fynger standeth is the fyrste place and damneth all the places vnder neth hym.

Now for to make grotes of these 4563 nobles. Fyrste ye shall set your fynger agaynst the fourth lyer, & take vp one of the foure counters that lyeth agaynste the sayd fourth lyer, & lay two counters belyde the nexte lyer aboue that, where your fynger standeth, for that is the seconde place frome youre fynger, and the two counters so layde standeth for 20 ℔ is one noble, and lyke as ye haue done with this one counter, so shall ye do with the other 3 folowynge. Then take vp the counter that lyeth betwen the thyrd and

the

the fourth lyer and laye two counters in the next space aboue that, and that is also 20 or elles ye may take it vp and laye one counter beſyde the ſeconde lyer, for the place where your fynger ſtandeth and ȳ is also 20. Then take vp the counter that lyeth betwyxt the ſeconde and the thyrde lyer, and laye 2 in the nexte ſpace aboue that, then take vp the counter that lyeth beſyde the ſecond lyer, and lay two counters beſyd the next lier aboue that ſame. Then ſet your fynger agaynſt the fyrſte lyer, and take vp one of the 1 counters and laye 2 counters for it beſyd the nexte lyer aboue that & as ye haue doue with that, ſo muſt ye do with the other two, & then ye ſhall fynde that 4563 nobles maketh 91120 grotes, and ſtandeth thus as the enſample hereafter ſheweth. And as ye haue done with theſe forewytē enſample of multyplication, ſo ſhall ye do with all other of multiplycacyon.



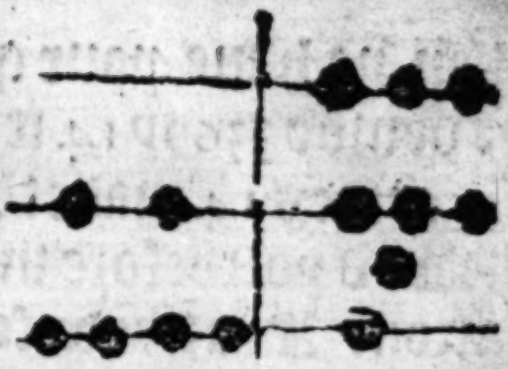
¶ Wyll ye knowe or proue whether ye haue multyplyed well or not, then deuide the grotes, that is 91260 by 20. & yf the summe come to stand as it was afore, then ye haue multyplied well. And thus alwaye ye maye make your proue vpon all maner of multyplycatours.

¶ Of diuision.

DIuision is to deuide a summe thorough an other summe: and in this diuision must be knowē two numbers, that is the number that ye wyll deuyde, and the number wherby ye wyl deuide it, as to knowe howe many tymes ye may

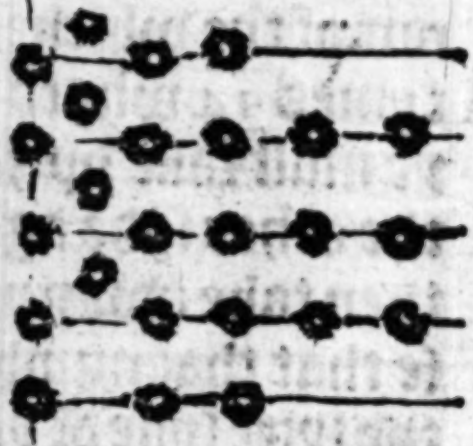
may haue a small number out of a greate as by ensãple, yf ye wyl deuyde 33⁶, by 14. as in this ensample hereafter. ffyrst laye 33⁶ on the right hand of your liers, & thẽ set your finger at ỹ hiest place where ani coũter lieth, for as I shewed you before, ỹ dammeth all the other places beneth, so ỹ then there as your singer is, is the fyrste place. And then loke ye may take 14 from that place, which ye can not do, for euery counter stãdeth but for one, bycause your singer is there, therfore ye muste remoue your singer to the nexte place benethe where the other 3 counters lye, and then loke yf ye maye take 14 from that place whiche ye maye do righte well, for these 3 counters at youre singer standeth but for 3 and the other 3 counters aboue standeth for 30, and then se howe manye tymes 14 ye maye haue out of 33 and so many counters ye must laye on the other syde iust againste your singer, that is to saye, ye may haue 28 out of 33, that is two tymes 14 out of 33, and therefore ye must take vp 28 and laye 2 counters on the other

other syde agaynst your finger, & then ye can haue 14 no more, then ye must remeue your figer



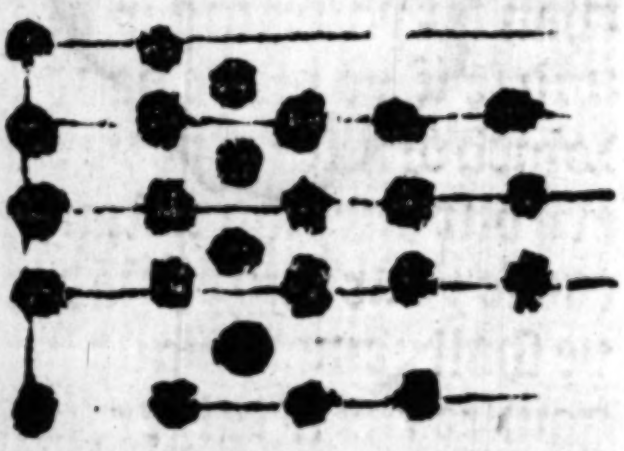
to the next place beneth, & thē reken that place at your finger to be the firste place, as ye did before: & then loke howe many tymes ye maye haue 14 from that place, whych ye can not, for that coūter at your finger stādeth but for 1, & the other in the space aboue standeth but for 10 whych is in all but 11, therefore ye muste remeue your fynger to the nexte place beneath, and then ye shal se that that number is 56 out of the whiche ye may well take out 4 tymes 14 whych maketh iust 56 therfore ye must take vp 56 and lay 4 counters on the other syde agaynste your fynger, and then take away your fynger, and ye shall se that that numbre that ye haue layed on the lyfte syde of your markes cometh iust to 24 as the example before shewed, and

then ye haue your question loyled, for if ye deuide 336 by 14 it cometh iust to 24 for 24 tymes 14 maketh iuste 336, as I haue shewed you before in the rule of multiplication. And likewise as ye haue deuided thys numbre, ye may do ẅ al other numbers. And if ye wyll proue whether ye hane wel deuided or not, take the numbre that cometh of your diuision, and multiply it with the small number that is your deuisor, and adde that remayneth therto if there be any, and than it will come iuste to the great nũber that was the numbre to be deuided. And lykewise, if ye wyll proue whether ye haue truly e multiplyed or no, take the greater numbre that commeth of youre multiplication, & deuide him by the number that is to be multiplyed, and it will come iust to the thirde number that was your multiplyer.



Yf ye delyre to knowe how many gro-
tes be in 79992 pens. Fyrste ye shall sette
downe your pens as ye se in this figure
afore, and ye shal deuide them with four,
for 4 d. maketh a grote. Now to the ope-
ratiō therof, whē that ye haue set downe
your pens as the fygure afore sheweth,
than set your finger at the hiest counter,
and se if ye maye haue 4 from that place,
which of a suretye ye can not, for there li-
eth but one, and it standeth but for one, bi-
cause your finger stādeth there, therfore
ye shall remeue your finger, and sette it a-
gainste the fifte lyer, and se if ye may take
awaye foure, the whiche ye maye doo, for
there lyeth 7. Now your finger standeth
againste the fyfte lyer, therefore ye shall
take vp the counter that lieth in the next
space aboue your fynger for that counter
is 5 and ye should take vp but 4 therfore
ye shall take it vp and laye it belyde the
fyfte lyer of the ryght syde, and laye 1 on
the lifte syde also belyde the fifte lyer, thē
se if ye can haue 4 any more from ẏ place
ẏ which ye can not, therfore remeue your

finger and set it agaynst ỹ fourth lier, and then se how many tymes 4 ye maye haue out of 39 ye may haue 9 tymes 4, and for this 9 tymes 4 ye shall laye 1 counter in ỹ space betwene the fourth and fyfte lyers, and 4 beside the fourth lyer, and ỹ make 9. And as ye haue done with these so shal ye do with all o= ther folowynge, & whan ye haue fynysshed youre worke ye shal fin de that 7999 pẽs make 1999 grotes as ye may se playnly here in thys figure.



¶ The proue.

¶ If ye will proue whether ye haue deui= ded well or not, then multiplye the grotes with 4, for 4 pens maketh a grote, and if the some come to stande as it did afore then ye haue deuided well.

¶ Itẽ when ye deuyde any summe wyth d. if there remayneth any thing it is pens And if ye deuide by shyllynges, yf there remay=

remaineth any thing it is shillinges. And as ye haue done with these forewrittē examples so may ye do with all other.

¶ The golden rule.

¶ Regula aurea iis called ỳ golden rule for lyke as golde passeth al other metall, so this rule passeth all other rules in awgrym. And to the operacion of thys rule must alwayes be noted thre thynges or thre numbres, of the which two of them must be like of names and of kynde, that is to wytte, the fyrste and the third number, and alwayes ye shall multiply the second number with the thyrde, & that that cometh of the multiplicacion is the number to be deuided by the firste number that is generall diuisor, and the quocient of the diuysor sheweth a number of solucion of name and kind of the middle numbers, as in these examples folowing shall appeare.

¶ If a man byeth 48 egges for 20 pens how many for 12 pens, if ye will soyle this question, ye muste multiplye the seconde and the thyrde number togyther, and

the product or the summe that commeth of that multiplication, ye shall deuyde by the firste numbre, like as here is shewed in thys example, when ye bye 40 egges for 20 pens, what shal one pay for 12 eggs ye shall multiply 20 with 12, commeth 240 the which ye shall deuide wt 40 cometh 6 pens, and so muche shall ye paye for the 12 egges. And thus ye may do with all other suche questions.

An other question.

Item a 100 apples cost 12 pens, what shal one pay for 87, ye shall multiplye 12, wyth 87 cometh 1044 the which ye shal deuide wt a 100 cometh 10 pens $\frac{44}{100}$ parte of a d. for the 87 apples. Will ye know how many farthynges that the 44 hūdzeth part of a peny is worth, thē multiply 44 with as many farthings as a peny is worth, ꝑ is 4 cometh 176 the which ye shal deuide with 100 cometh 1 farthyng and $\frac{67}{100}$ part of a farthinge.

Item 165 pounde of ware cost 2 li. 5. s3. 6 d. 9 mites, what shall coste 22 li. For to soyle this question and suche other lyke

firste

fyrst ye muſt make of poundes ſ3, & adde therto the odde 5 ſ3. the whyche ſtande in this queſtion, and they come togyther to 45 ſ3. then make of the ſ3. pens, and adde therto the odde 6 pens that ſtãdeth in the queſtion cometh 546 d. than make of the pens mytes, and 24 mytes is a peny, and therto adde the odde 9 mites, that ſtandeth in the queſtion commeth togither to 13113 mytes, and that is the totall ſumme of all the li. ſ3. d. & mites togyther. Nowe make it after the rule and ſay 165 pounde of waxe coſt 13113 mytes, what ſhall coſt 22 pounde, fyrſt multiply the middlemoſt and the laſte togyther, that is: ye ſhall multiplye the mites wyth the laſt, that is wyth 22, & it ſhall come to 388486, deuide them with 165 and it ſhal come to 1748 mites and $\frac{6}{165}$ parte of a myte, ſo manye mytes ſhall the 22 pound of waxe coſt. Now wyll ye know how manye pence that the foze wzitten mites make: the deuide the 1748 foz 24 mites maketh 1 peny. Then will ye know how many ſ3. that the pens make, then deuide them wyth 12, foz 12 d.

maketh a ſz. And thus doyng ye ſhal find that ꝑ 22 li. of waxe ſhal coſt 6 ſz 29 mites and $\frac{66}{165}$ part of 1 mite and it is done.

¶ Item whē there ſtandeth 1 in the fyrſt place. As 1 goos coſt 3 d. what ſhall coſt 28 ye ſhal multiply the myddeſt with the laſt in ſaying 3 tymes 28 is 84 ſo many pens coſt 28 geſe, and it is finiſhed.

¶ Item in the cōtrary as when that 1 cometh in the later ende, as here in this enſample 20 capons coſt 23 pens, what ſhall coſt 1 capon. For to ſoyle this queſtion ye ſhal deuyde the middlemoſt with the firſt that is 23 with 20 cometh 1 d. & $\frac{3}{10}$ part of a peny, that is 10 mites & $\frac{4}{5}$ part of 1 myte for 1 capon.

¶ Item 17 elles and $\frac{1}{2}$ coſt 14 nobles and $\frac{1}{2}$ part of a noble, what ſhall coſte 31 elles and $\frac{2}{5}$ part. For to ſoile this queſtion and ſuch lyke firſt ye muſt breake the firſt and laſt broken togither crokewiſe in ſayinge 1 times 4 is 4, ſet the 4 by 17 els. Thē ſay 3 times 2 is 6, ſet ꝑ 6 by the 22 elles. Then multiply both the numbers of your fractions

tions

tyons togither in sayinge 4 tymes 2 is 8 the which ye shall set vnder 4 and 6, then it standeth thus: as in the rule of thre, yf 17 elles & $\frac{4}{8}$ part of an elle cost 14 nobles and $\frac{1}{3}$ part of a noble, what shal cost 32 els and $\frac{6}{9}$ parte of an elle. First multiply the fyrst hole numbre with the nethermost of his broken that is 17 with 8 cometh 136 & therto ye shall adde ỹ 4 that standeth aboue 8 cometh 140, the which ye shal multiplye with the 3 that standeth vnder the second brokē cometh 430 that is your deuisor, then multiply 14 with the 3 that stādeth vnder 1 & adde that 1 therto cometh 43 that is your multiplicatour, then multyply 32 wyth the nethermost figure of the broken, that is wyth 8 & adde therto the same 6 that standeth aboue the same 8 cometh 262. Now set it in the rule of thre in saying 420 elles cost 43 nobles, what shal cost 262, multiply the second with ỹ third and then deuide that that cometh of that multiplycation wyth the fyrste, and ye shall fynde that the 32 elles of cloth cost 26

nobles 16 d. 34 mytes and $\frac{150}{420}$ parte of a myte.

¶Item whan that there standeth at the begynninge a hole numbre with a broken and in the seconde and thyrde place no broken, as here. 36 elles and $\frac{1}{2}$ coste 8 li. what shall coste 16 elles. For to soyle thys question, ye must multiplye the first hole number wyth the vndermost fygure of his broken, that is 36 wyth 2 and adde the 1 therto that stãdeth aboue the 2 commynge 73, and that is your deuisor, then multiplye 8 li. also wyth the vndermoste fygure of the broken, that is to wite with 2 and it cometh to 16, then multiplye 16 which 16 cometh to 259 the which ye shall deuyde wyth 37, and it wyll shewe you that there shall be to pay for the forsayd clothe 3 pounde ten shyllinges 1 penye 17 mites, and $\frac{23}{37}$ part of a myte.

¶Item when there standeth in the fyrst nor in the seconde no broken numbre, but in the latter ende a hole number wyth a broken, as here, 14 ounces of grayne cost

14. ſ3, what foꝛ 9 ounces of grayne and one thirde. Foꝛ to knowe this ye ſhall multiplye the firſt 14 with 3 that is youre deuiſoꝛ, then multiplye 9 with 3 and adde that 1 therto ẏ ſtãdeth aboue 3 cometh 28 thẽ ſet it thus 42 geueth 14 what geueth 18, make it foꝛth after the rule and ye ſhal finde that there is to paye 9 ſhillinges 4 pens foꝛ the 9 ounces of grayne and one thirde parte.

¶ Item when that ye finde neyther at the beginninge noꝛ at the latter ende no broken numbꝛe, but in the middes a hole with a broken as here. A man bought 48 ſheps foꝛ 64 crownes and — what ſhall coſt 18 ſhepe. Foꝛ to ſoyle this queſtion ye muſt multiplye 48 with 4 cometh 192 that is your deuiſoꝛ, then multiplye 64 with 4, and adde thereto the 1 that ſtandeth aboue 4 cometh 257 the whiche ye ſhall multiplie with 18 cometh 4626 the which ye ſhall diuide wyth 192. And thus ye ſhall finde that ye muſte paye foꝛ the 18 ſheps 24 crounes 4 ſtiuers and 36 mites.

¶ Item

¶Item when ye finde no broken at the beginnyng but in the seconde and thyrde one hole with a broken. As 7 elles for 6 pounde $\frac{1}{4}$ what shall coste 16 elles ℔ $\frac{1}{5}$

For to soyle this question ye must multyplye the two vndermost broken numbers togither, in sayinge 3 tymes 4 is 12, the whych ye shall multiplye with 7 cometh 84 that is the diuisor. Thē multiply eche with his brokē cometh 25 and 46 ẏ which ye shall multiply one with the other, cometh 1225, the which ye shal deuide with 84, and the solucion shalbe to paye l.4.li.12 s.3.18.d.

¶When that ye fynde at the begynninge and the middes a hole with a broken, and at the latter end standyng a hole without a broken as 9 elles ℔ $\frac{1}{4}$ for 5 pounde $\frac{1}{8}$ what shall cost 15 elles multiply 9 wyth 4 and adde therto 3 cometh 59, the which ye shall multiplye with 8 cometh 312, that is your deuisor then multiply 5 with 8 and adde therto the 5 that standeth aboue 8 cometh 45 the which ye shall multiply with

4 that

4 that standeth vnder ỹ fyrste broken, cometh 180 Now set it in the rule of thre in saying 312 gyues 180 what giueth 15, make it after the rule and it cometh 8 li. 13 sh. 22 mites and $\frac{10}{50}$ of a myte.

¶ The rule of company.

¶ There be 3 marchauntes or companyons the whyche laye togither their money in marchaundyse, and eche to wynne after his inlayinge, wherof the fyrst layde in 170 crounes. The secõd 60 crounes The third 40 crounes & therwith they haue wonne 50 crounes beside al vncost. Now I demaunde howe muche that eche shall haue after his inlaying. Now for to soyle this question and all suche other rules of company ye must make of their moneye that they haue layde in a totall summe cometh 250, nowe saye 250 gyueth 50 what gyueth 150 make it after the rule of there and it cometh to the fyrst man 30 crounes winninge. Nowe for knowe what the seconde hath wonne, ye shall saye 250 gyueth 50 what giueth 60 make it after

the

the rule, and ye shall finde that the second hathe wonne 12 crownes, wyll ye knowe what the third hath, then say 250 geueth 50 what geueth 40 make it after the rule, and ye shal find that the third hath wonne 8 crownes. And thus shall ye do wyth all other rules of company.

¶ The rule of company wyth tyme.

¶ Thre felowes doth marchaundice togither, wherof the first layeth in 50 crownes for 4 monethes. The second 80 crownes for 2 monethes. The third 100 crownes for 5 monethes, & wyth all this mony they haue wonne 6 crownes beside al vncost payed. Now I demaund what eche hath wonne with his money, for to know thys, ye muste multiplye eche mannes money with his tyme, that is, for the first 50 with foure, commeth 200 set them as thoughe he hadde layed in so muche, for the seconde multiplye 80 with 2 cometh 160 set it also as thoughe he hadde layed in so muche, for the thirde multiplye 100 with 5 cometh 500 set that also as though

he

he hadde layed in so muche. Nowe adde the 3 numbers togyther, and then make it after the rule of companye, and then shall ye finde what eche hath wonne with his money.

The rule of baterynge.

¶ Two Marchaunt men wyll chaunge theyr wares togither, and the one hath a fine blacke clothe the whyche is 43 elles longe, and he wyll gyue the elle no lesse than 18 pens. The other marchaunt hath peper, and he wyll sell the pounde no lesse than 13 d. Now I demaunde how many pound of peper the first marchaunte shall haue for his 43 elles of clothe. For to soyle this question ye shall saye 13 geueth 43 what geueth 18, make it after the rule of 3 and ye shall finde that the firste shall haue for his clothe 59 pound of Peper 8 ounces 12 englyshe and $\frac{4}{13}$ part of an englyshe.

Of a Watte.

¶ A watte runneth in the field and ouerrunneth in one mynute (there be 60 in an houre) 12 roddes of grounde. And a gra-

hound

hounde beynge hyr enemie, folowyth hir and ouerrunneth in one mynute 15 roddes of ground. But or the grahound began to runne the hare had runne 200 roddes of land. Now is to be demaunded in how many minutes and how many roddes of land was the Hare taken. For to foyle thys question and such lyke, ye shall subtra the lesse runnynge out of the more that is 12 out of 15, and there remayneth 3, and therwyth ye shall deuide the space that the hare had runne afore or the grahounde began to runne, that is 200 roddes. And in so doynge ye shall finde that the grahounde ouertoke the Hare in the 66 mynutes and $\frac{2}{3}$ partes of a mynute that is one houre and 6 minutes and $\frac{2}{3}$ of a mynute, wyll ye knowe how many roddes that the grahound did runne or that he toke the Hare, then multiplye 66 and $\frac{2}{3}$ with 15 cōmeth $\frac{3000}{3}$ the whyche ye shall deuyde with 3 cometh 1000 hole so many roddes dyd the hounde runne or that he toke the hare.

The

¶ Two felowes went togither out of a towne, and the one goeth euerye daye 12 mile, and the other goeth the fyrste daye but 1 myle, and the seconde daye 2 myles the thyrde daye 3 myles, and so forth euery day one mile more. Now I demaund in how manye dayes and how many mile went he or that he ouertoke his felowe. For to soyle this question, ye shall double the myles of hym that wente euery daye lyke much, that is 12 and two tymes 12 is 24 therof ye shal subtra the one mile that the other goeth the firste daye, and there resteth 23, vpon the same daye was the first man ouertaken of his cõpanion, will ye knowe in how many myle, then multiply 23 with 12 cometh 276 for so many miles went he or he ouertoke him.

¶ A man hath a golden croune of 34 stuuers and a Phylyppus gulden of 15 stuuers, and a ducate of 28 stuuers, and with this money he goeth to the chaũger and wyll haue for it negenmannekens crownes of 9 mites, & of 3 mites and of 2 mites

and halfe mytes. Now I demaund how muche that he shal receaue of eche for the forsayde golde, and receaue of eche lyke much. For to soyle thys question and such lyke, then make of all the greate money that he will chaung mytes, for that is the least coyne that he wyll haue, and cometh 9072 mytes, then loke howe many mytes that al the smal pens be worthy that he wil haue, that is 25. Now deuyde the greate summe of the mites, that is to witte 9072 wyth 25 and ye shall fynde that he muste haue of ech 362 and $\frac{11}{25}$ and it is done.

Of foure carpenters

¶ Foure Carpenters wyll make a house wherof the first taketh vpō hym to make it hym selfe alone in a yere. The seconde will make it in two yeres. The thyrd wil make it in 3 yeres. And the fourth in four yeres. Now I demaunde yf all these 4 wrought vpon that house, in what space would they 4 make that house. Wyll ye know that, then say, the first would make it in one yere, ẏ were 12 tymes in 12 yere The second in 2 yeare, that were 6 tymes

in 12 yere. The thirde in 3 yere, that were 4 times in 12 yere. And ỹ fourth in foure yere that were 3 times in 12 yere. Nowe summe them all togyther that is 12, 6, 4, 3, cometh 25, therwith deuide 12 cometh $\frac{13}{25}$ parte of a yere. Now if ye wil know how many dayes that it is, then multiplye 12 wyth 365 for so manye dayes be in a yere, & that that commeth of that multiplicacion deuide it by 15 cometh 175 daies and $\frac{5}{15}$ part of a daye.

¶ The rule of false positions, by the whiche al maner of difficult & hard questions may easely be dissolued and fyrst of one false position.

NOw shall ye know how by false positions or cõiectures one or two ye shall fynde out the verye trueth of that the whyche ye seke for, and firste ye shall vnderstand howe to finde the truth of a question proposed by one coniecture or position.

When that anye question is put forthe vnto you too be alloyled, of the whyche one parte is knowen, and the other vnknowen. Answer to that question by and by wyth youre selfe at all aduenture, and then consider with your selfe whether ye haue made right answer or no, if not, loke what proporcion is betwene your coniecture and that that folowethe of your consecture, & the same proporciō is betwene the thing knowen, and that that pertayneth vnto the selfe thinge beynge yet vnknowen. And by example ye shall more playnely perceaue.

¶ A certayne wayfayrynge man cōminge by the waye founde so manye crownes, that the second, the thyrde, & the fourthe parte of them added togyther, made 50, I demaunde what summe he founde. To make answer to thys question by one position, ymagyne some summe that hath these partes in it, that is to saye: a second a thirde, and a fourthe parte, and be it 12, whose seconde parte or halfe is 6 thyrde parte 4, the fourth parte 3, whych all added

ded togither 643, make 13, but the summe that he founde, the second, thyrd, and the fourthe of it made 50. wherefore 12 is not the summe he found, therfore this positiō is falfe, and yet by thys falfe fhall ye come to the lyght of trueth, by the helpe of the rule of thre. For loke what proporcyon is betwene the feconde, the thyrde, and the fourthe parte of 12 added togyther, the whych maketh 13. and 12 whole partes there be, the fame proporcion is betwene 50 whych is the feconde, the thyrde, and the fourthe parte added togyther of the number vnknowen, & the fame vnknowē number it felfe. Then faye thus wyth thy felfe: if 13 whyche contayneth the forefayd partes in them, come of 12 of whome come 50, then fet them thus 13, 12, 50, then by the rule of thre multiplye 50 by 12, and therof commeth 600 dyuyde the fame by the fyrfte nomber 13 and in the quotiente thou fhalt fynde $46\frac{2}{13}$ the whyche was ỹ fomme of the crownes the which the man founde: of the whyche fomme the halfe part is $23\frac{1}{13}$ the thyrd parte is $15\frac{1}{13}$ the fourth

fourth parte 11 7/13 the whiche partes added togither make iuste 50. Thus thou seest how that by one false posicion or conjecture wyth the helpe of the rule of thre, this question is soone dissolued.

¶ An other question.

¶ Fynde me a number in the whych 5 is 2/3 that is to say, two thyrd partes of hym

Answer. ymagen any nũber ye lyst 3 that hath thirdes in it, as be it 6, then loke what is the thirde part of 6, that is 2. thẽ two of this thirde partes of 6 maketh 4. wherfore this posicion is false, yet by this false position with the helpe of the rule of thre, ỹ shalt find out the trueth, after this maner. If 4 be the 7/3 part of 6 to whom is 5 1/3 partes serche by the rule of thre, thou shalt fynde it 5 1/3

¶ An other question.

¶ What number is that in the whych after that the thirde, the fourth, and ỹ fyfte parte be deducted out of it, there shal yet remayne 24? Answer. ymagen any number that hath a thyrde, a fourth, & a fyfte

in

in him. As for example: say it is 60, then subtrahe out of him his thyrd, his fourth and his fyfte part: and thou shalte fynde remayne but 13. Lo how much thou haste mysled thou shouldest haue founde suche a nomber, in the which after the forsayd partes were subtrahed shuld remayne 24 and here remayneth but 13, yet proue by the rule of thre, and thou shalte fynde the trewe number. If 13 remayne after the substraccion of the aforesayd partes is 60 what number is that out of the which after lyke substraccion of his thyrd, fourth, & fyfth parte shall remayne 24, proue by the rule & thou shalt fynde it. 110 1/1 whose thyrde part is 36 11/13 the fourth 27 10/13 the fifte 22 2/3 which all added together make 86 10/13 the whych deducted out of 110 20/13 shall remayne 24. These and diuerse other questions before reherled by ȳ same crafte one falle posicion maye soone be assoyled. Now wyll I shewe you how to dissolue all maner of questions howe difficulte so euer they be by two falle posy-

cions. For by one falſe poſicion ye ſhal not aunſwere to all maner of queſtions, but two falſe poſicions, what euer queſtion it be, it may ſoone haue ſolucion,

How to aunſwere by two falſe poſicions.

INnumerable queſtions do chaunge in numbres, the which though they can not be diſſolued by one poſicyon or coniecture yet ſhall it not myſſe but be alloyled by two poſicions: in the whyche maner ye muſt diligently note how farre aboue ỹ trueth or vnder bothe poſicyons do fall: For by the obſeruacyon of .ij. coniectures how nere they be to the trueth, & the difference of the errors whych enſue of the poſicions, the verite commeth to lyght which may be done .iij. wayes: one way by the rule of both more or both leſſe another way by the rule of the one more and the other leſſe.

¶ When bothe poſicions be more then the veryte or both leſſe, then ſubduce the leſſe errour out of the more errour, & that that remayneth ſhalbe the diuyſor: then mul-

multiply the first errour by the second po
sicion, & the latter errour by the first po-
sicion, and then this two numbres beyng
multiplied, deduct the lesse out of the mo-
re, and that that remayneth diuide it by ỹ
forelayd diuisor, and the quociente shall
shew the veryte. Example.

¶ Thre marchaũtes diuided a 100 crow-
nes so that the second should haue 3 crow
nes more then the fyrste, and the thyrd 4.
mo then the secõd: I demaund now how
many crownes eche of them receaued.

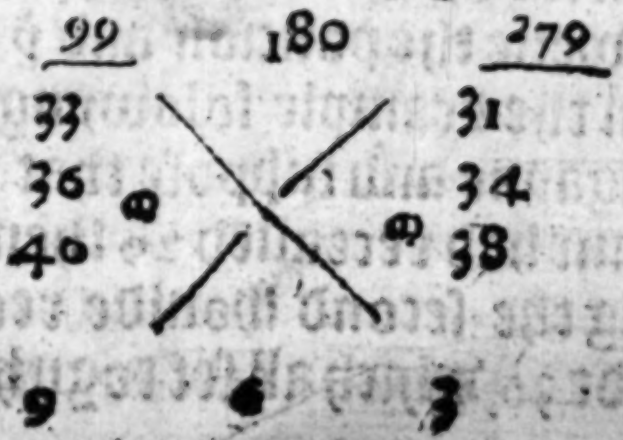
Aunswere. First make sayncte Androwes
crosse, as ye see hereafter, then coniecture
what ye lyst, as for exãple. Say the fyrste
had 33, and then muste the seconde haue
36, and the thyrde marchaunt 40, whych
somme gathered togither maketh 109 but
ye had but 100 to diuide, wherfore ye ha-
ue mysled, and your posicion redowndeth
to more then the very somme by 9, which
came of your fyrste posicion 33 wherefore
set the first posicion 33 at the vpper ende
of the crosse on the left syde of the crosse,
and the errour which hath ensued of that

at the foote of the crosse on the same side, as ye se in the example. And for bycause that this coniecture came to more thē the trueth, therfore set this letter M. in the space betwene the vpper ende of ỹ crosse and the nether. And for as muche as in this firste coniecture ye haue erred thus much, coniecte agayne and suppose that the fyrste marchaunte had 31 then muste the seconde haue 34, the thyrd 38, al these collecte make 103, so that nowe ye haue erred agayne, youre posicion beynge to much, so that your errour is 3. and for because that thys seconde posicio is more then the veryte as the fyrste was, set the posicion 31 at the vpper ende of the crosse on the right side, and the errour 3 ỹ foote of the crosse on the same side, & put this letter M. betwene the space to sygnifye more. Bothe these posicion then be more then the verite, wherfore accordynge to the rule fyrst subduce the lesse errour 3 at the foote of the ryghte syde of the crosse from the greater errour at the foote of ỹ lefte syde of the same crosse, remayneth 6

to

to be set in the space betwene both ȳ feete as ye se: whych shalbe the deuysor. Then accordyng to the rule, multiplye the firste position, which is .33 by the errour of the seconde position which is 3, and therof cometh 99, then the seconde posicion 31 by ȳ errour 9 of the first posicion, and therof cometh 279. then deduct the lesse summe 99 out of this more summe 279, remayneth 180, diuide this summe by the difference of the errours whyche is 6, and the quocyent shalbe 30 whyche is the trew posycyon. For the fyrste man hauyng 30, the seconde must haue 33, and thyrd 37, which all set togither, make iust 100. Thus wonderfull craftly by these. ij. false posicyons the trewe and iust posicion is brought to lyght.

¶ The example.



¶ An example when both posicions come to lesse then the verite.

When both posycions come to lesse thē is the veryte, the whyche is all one matter wyth the other, as ye shall perceaue by the same example agayne. As suppose ye had conie cted that the first had receaued 27, thē must the seconde receaue 30, and the thyrde 34, whyche added together make 91 whyche is lesse by 9 then ỹ somme 100, the which should be deuided among them. Set then thys fyrste false posicion 27 at the vpper ende of the crosse on the left syde, and the errour ensuynge of that at the foote of the same crosse on the same syde. And for bycause ỹ this posicion come to lesse then the verite therfore sette thys letter L. for lesse, in ỹ space betwene the posicion and ỹ erroure as ye se in the example folowynge. Then coniect agayne and suppose that the fyrst marchaunt had receaued 29 then by that rekenyng the second shoulde receaue 32 the thyrde 36, which all set togyther make

97, so that yet this posicion commeth not to the veritie 100 but lacketh 3 of it, wherfore set this position 29 at the vpper ende of the crosse at the righte syde, and thys erroure 3 at the foote of the crosse, and in the space betwene the position and the errour set thys letter L, for lesse. Now for so muche as bothe these positions be lesse then the veritie, worke as ye dyd before, accordinge to the rule, subduce the lesse errour 3 out of the greater erroure 9, remayneth 6 for the deuisor to be set in the space betwene the two errours. Thē multiplye the first position 27 by the seconde errour 3 commeth 81, then the second conjecture 29 by the first errour 9 cōmeth 261 then deduct 81 out of 261 remayneth 180, whych diuyded by syxe the dyuysor afore sayde, the quotiente shall be 30 whyche is the iust and verye coniecture, the whych ye should haue coniected. Thus ye haue had sufficient example of this first rule of both more, and both lesse.

There

Here after folowethe the example of both lesse.

81	196	261
27		29
30		32
34		36
6	6	3

Here folowethe the rule of one moze, and the other lesse.

When the one posityon amounteth to moze then the veritye, and the other lesse then the veritie, thē adde the errours togither and that added number shall be the diuysor. Then multiplye the fyrste position by the second errroure, and the second posityon by the fyrste errroure, and that that commeth of both these multiplycatours adde theim togyther also, then deuide thys added nūber by the added errours the diuisor afozesaid, and the quocient sheweth the true position.

The example.

I wee wyll take the fyrste cale agayne,

and

and ſuppoſe that the firſte Marchaunte hath receaued 32 crownes, then muſt the ſecond receaue 35, & the thirde 39, whych all added togyther make 106, wherefore that polytyon is falſe and to muche by 6 ſette the poſition 32 at the vpper ende of the croſſe, and the errour 6 at the neither ende of the croſſe in the ſpace betwene, ye ſhall ſet thys letter M for more. And for bicauſe that this poſition hath exceaded the veritie, conuecte againe leſſe, and ſuppoſe that the fyrſt hath receaued 29, then muſt the ſecond receaue 32, the thyrde 36 all added togyther maketh 97, whiche is leſſe thē the veritie by 3, wherfore ſet this falſe poſition 29 at the vpper ende of the ryght ſyde of the croſſe, and the errour 3 at the nether fote of the croſſe, in the ſpace betwene ſet this letter I, for leſſe. Of this two falſe poſicyons the one is more then the trueth, the other is leſſe, wherfore accordinge to the rule adde both ỹ errours 6 and 3 togyther, that maketh 9 for the diuyſor: then multiplye the firſte poſicion 32 by the ſecond errour 3, whych maketh

96,

Here after foloweth the example of both lesse.

51	196	261
27		29
30		32
34		36
6	6	3

Here foloweth the rule of one moze, and the other lesse.

When the one posityon amounteth to moze then the veritye, and the other lesse then the veritie, thē adde the errours togither and that added number shall be the diuysor. Then multiplye the fyrste position by the second erroure, and the second posityon by the fyrste erroure, and that that commeth of both these multiplycatours adde theim togyther also, then deuide thys added nūber by the added errours the diuisor afozesaid, and the quocient sheweth the true position.

The example.

I wee wyll take the fyrste case agayne, and

and ſuppoſe that the firſte Marchaunte hath receaued 32 crownes, then muſt the ſecond receaue 35, & the thirde 39, whych all added togyther make 106, wherefore that poſytyon is falſe and to muche by 6 ſette the poſition 32 at the vpper ende of the croſſe, and the errour 6 at the neither ende of the croſſe in the ſpace betwene, ye ſhall ſet thys letter M for more. And for bicauſe that this poſition hath exceaded the veritie, conuecte againe leſſe, and ſuppoſe that the fyrſt hath receaued 29, then muſt the ſecond receaue 32, the thyrde 36 all added togyther maketh 97, whiche is leſſe thē the veritie by 3, wherfore ſet this falſe poſition 29 at the vpper ende of the ryght ſyde of the croſſe, and the errour 3 at the nether fote of the croſſe, in the ſpace betwene ſet this letter l, for leſſe. Of this two falſe poſicyons the one is more then the trueth, the other is leſſe, wherfore accordinge to the rule adde both ỹ errours 6 and 3 togyther, that maketh 9 for the diuyſor: then multiplye the firſte poſicion 32 by the ſecond errour 3, whych maketh

96,

96, and the secunde polygon 19 by the fyrste errour 6, whych maketh 174, and that that ensueth of both these multiplycations adde it togyther, and it maketh 270 deuide thys added numbre by the added errours, which was 9, and the quocient shall be 30 whyche is the true posicion as ye maye proue.

¶ The example.

¶ Thus maye ye dissolue all other maner of questions whyche haue ben set before in this boke, wythout great payne or studye.

Finis.

¶ Imprynted at London by John Waley, dwellinge in Foster Lane.